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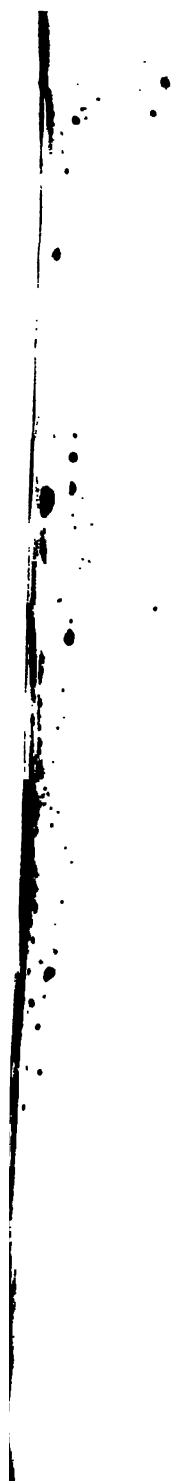
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PLATES

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ON

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OPTICS, GEOGRAPHY, ASTRONOMY, AND DIALLING.*

EDITED AND ENLARGED

BY DAVID BREWSTER, A. M.

THIS AMERICAN EDITION, CAREFULLY REVISED AND CORRECTED

BY ROBERT PATTERSON,

PROFESSOR OF MATHEMATICS, AND TEACHER OF NATURAL PHILOSOPHY, IN THE
UNIVERSITY OF PENNSYLVANIA.

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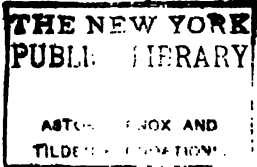


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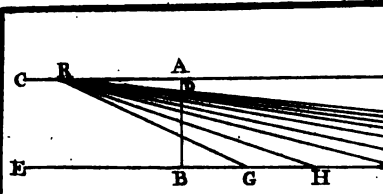


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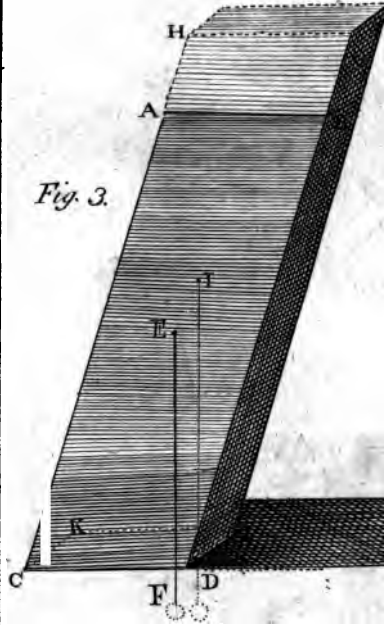
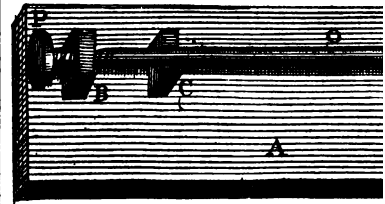
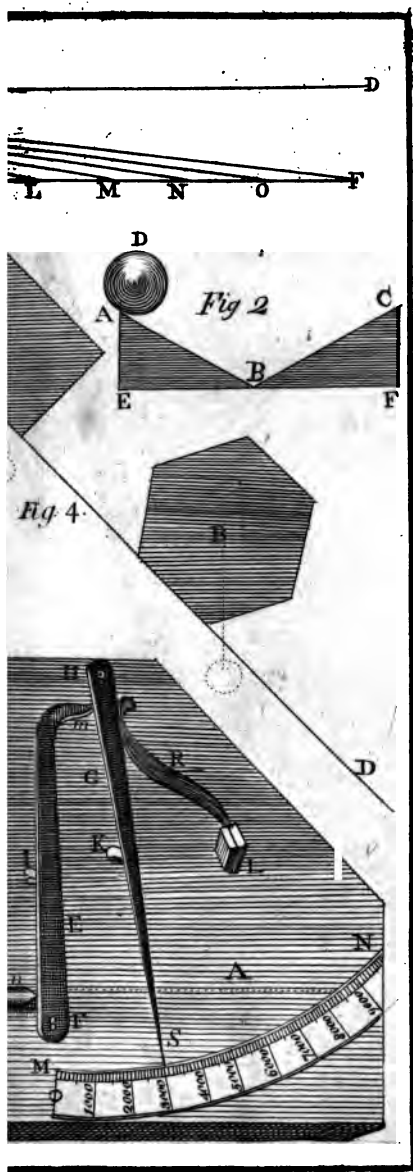
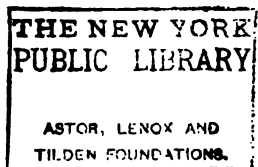


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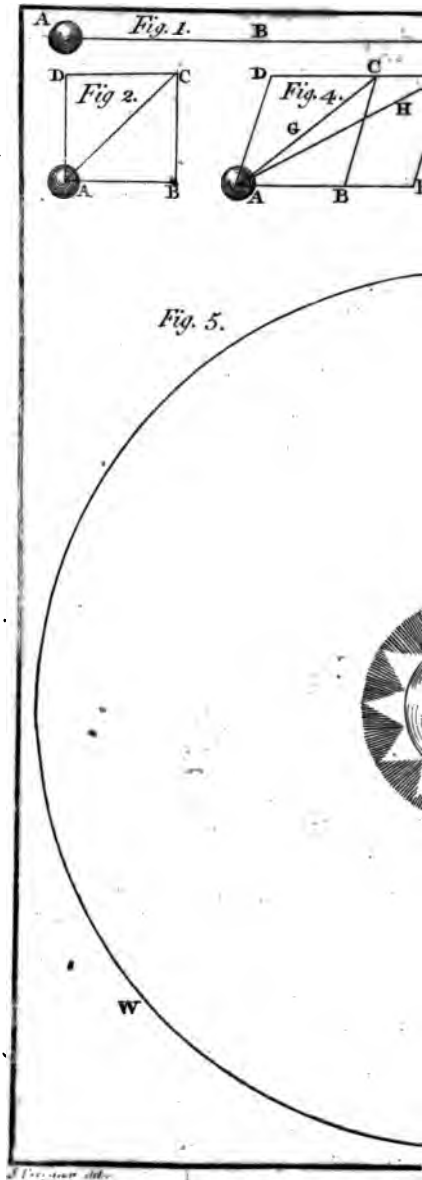
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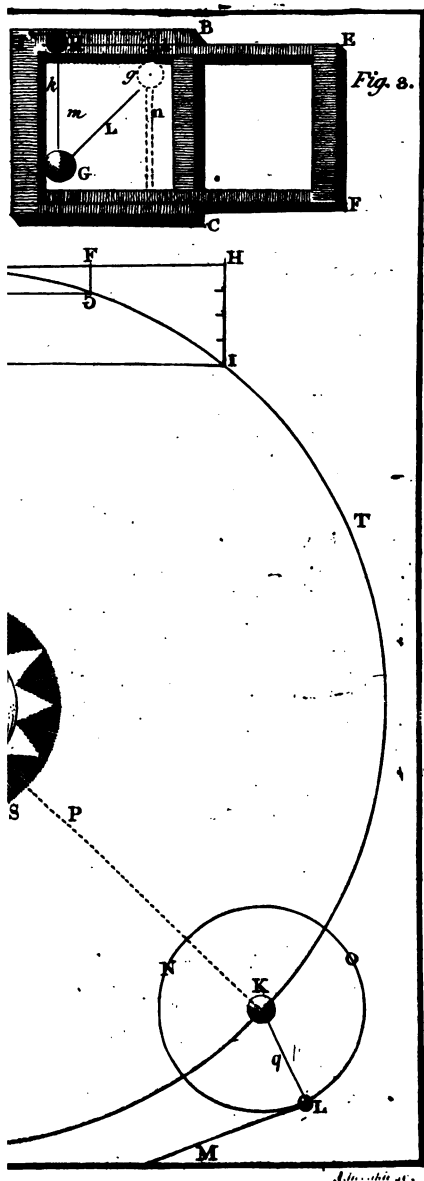


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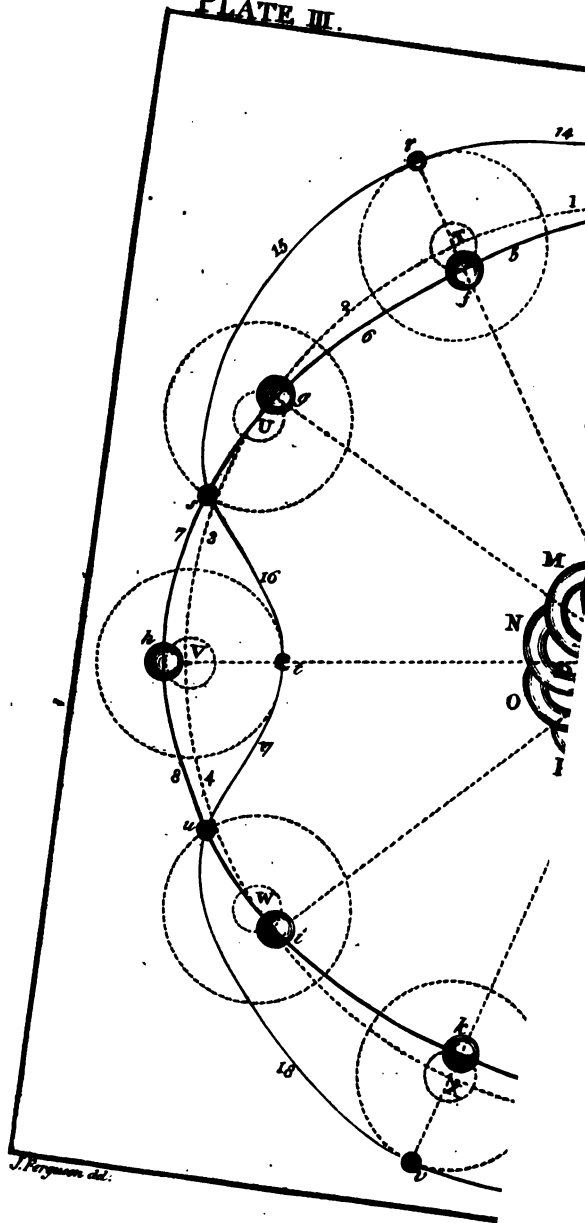
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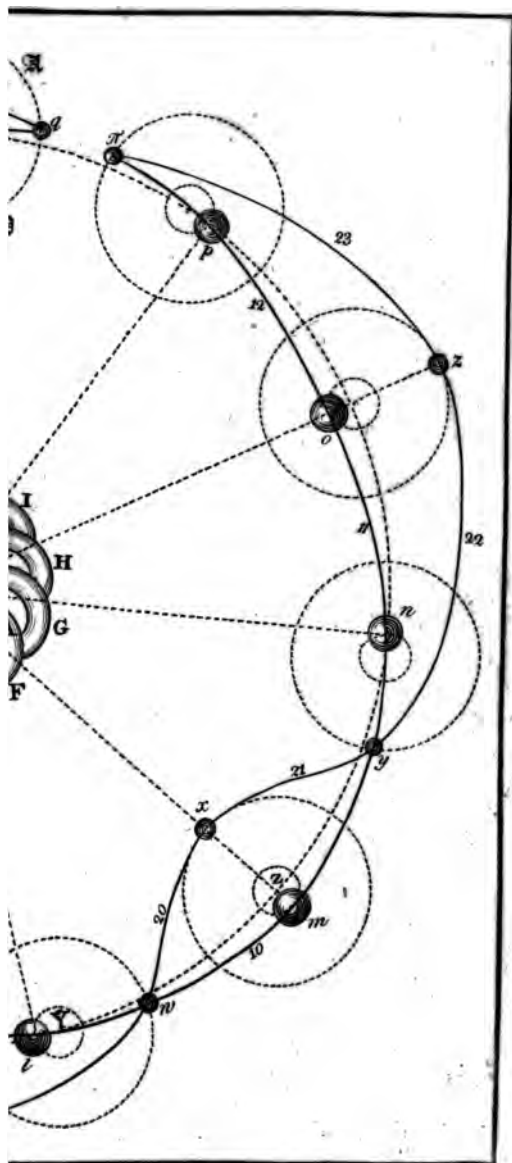
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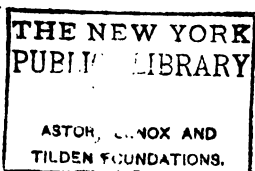


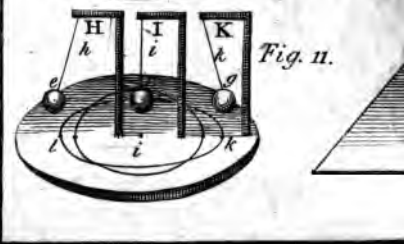
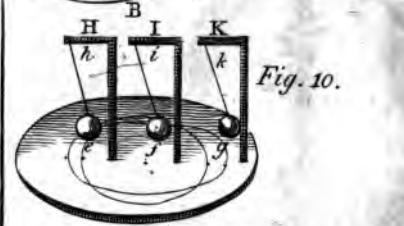
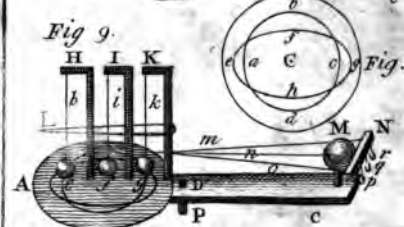
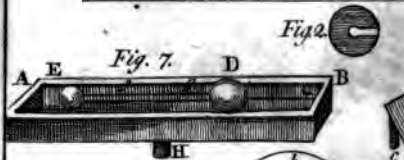
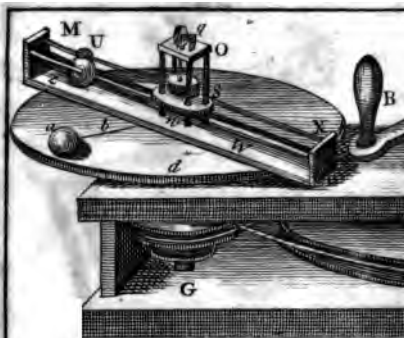
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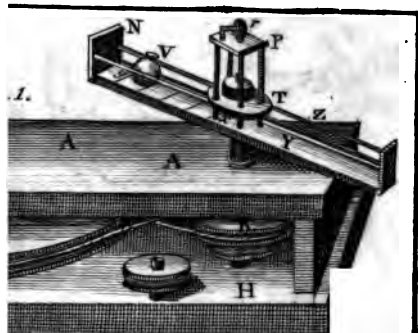


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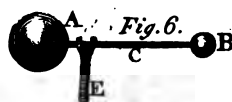


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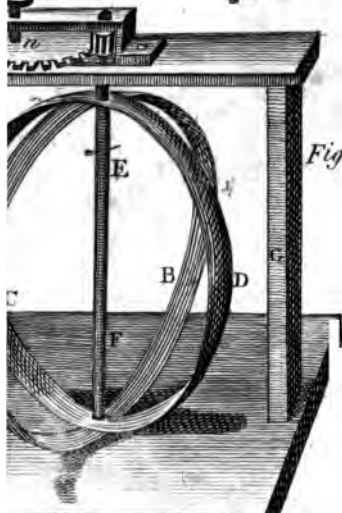


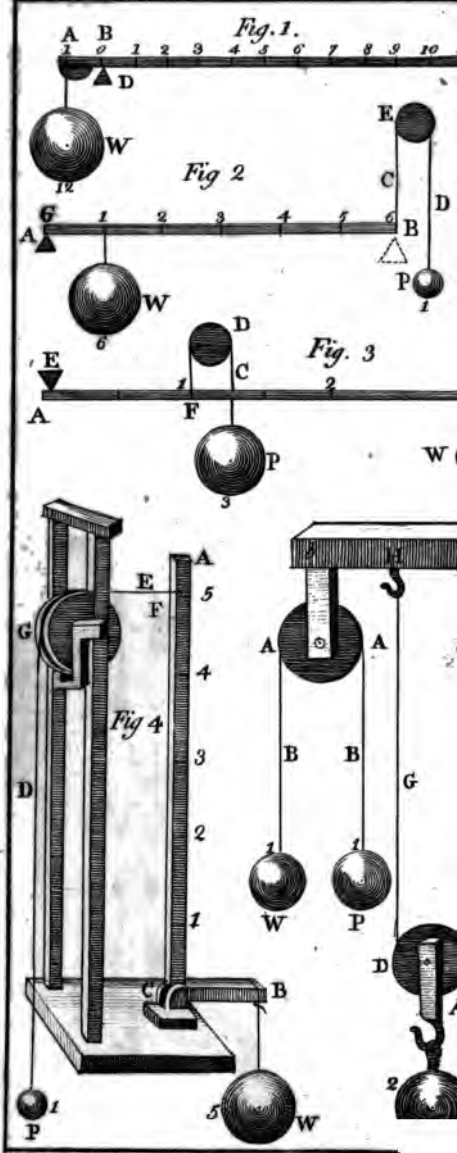
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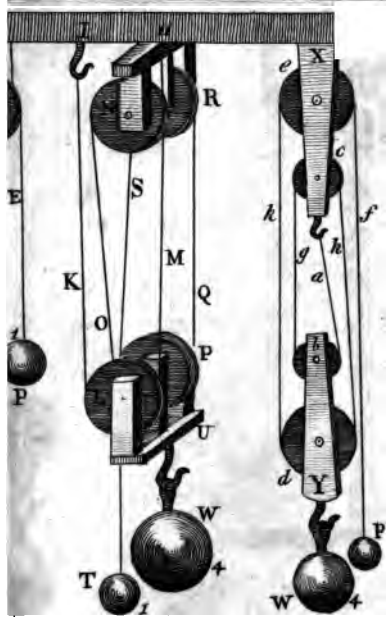
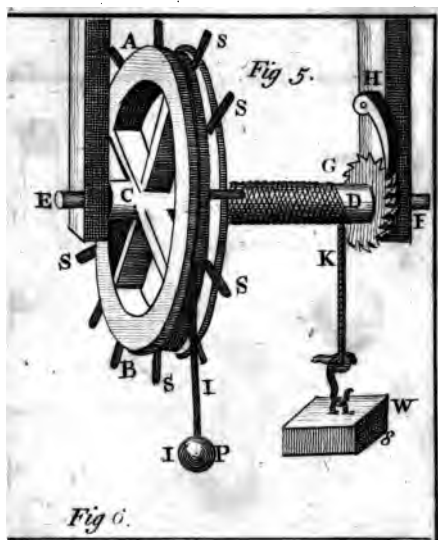
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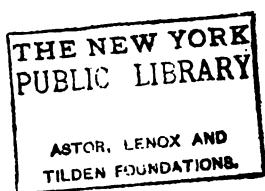
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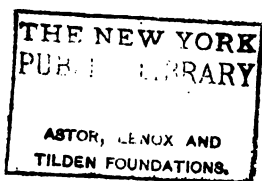
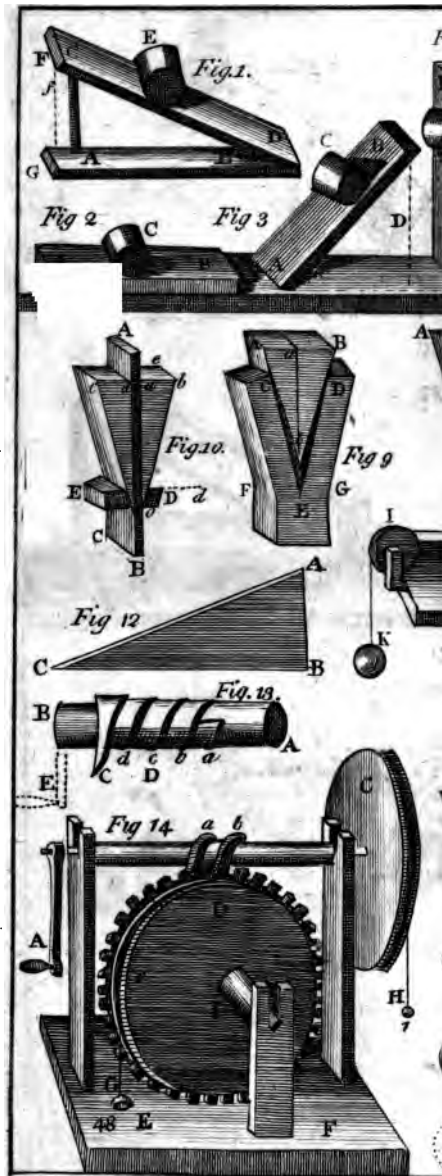
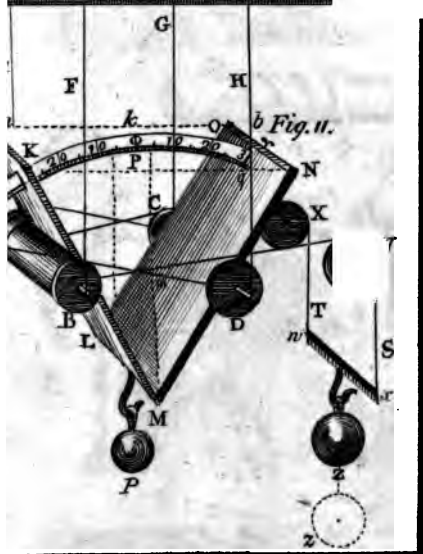
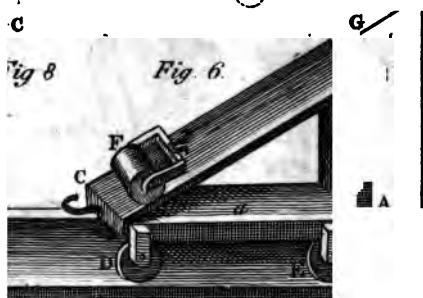
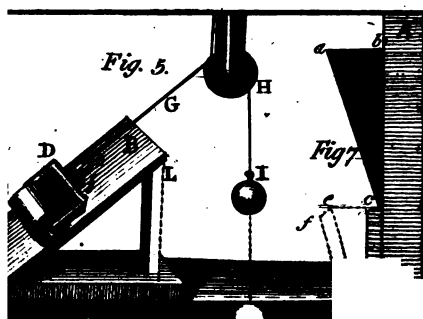
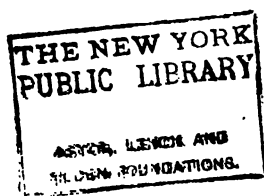


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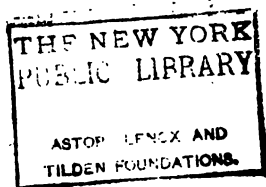
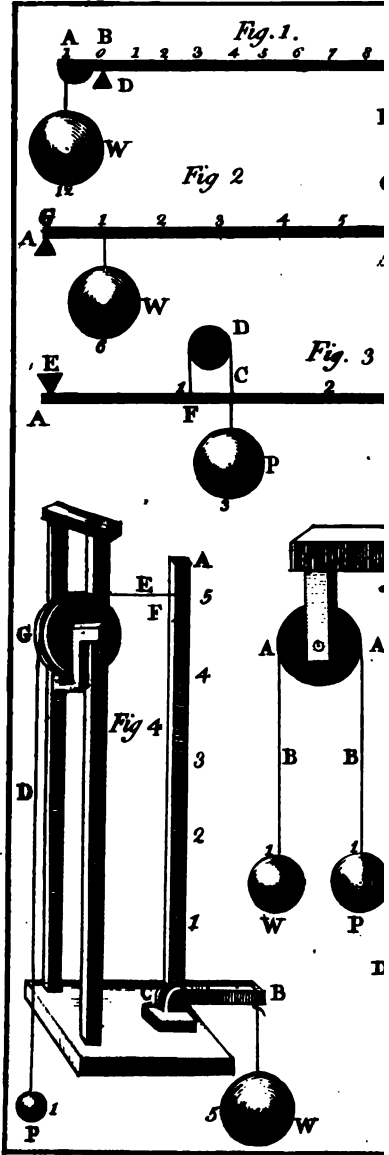
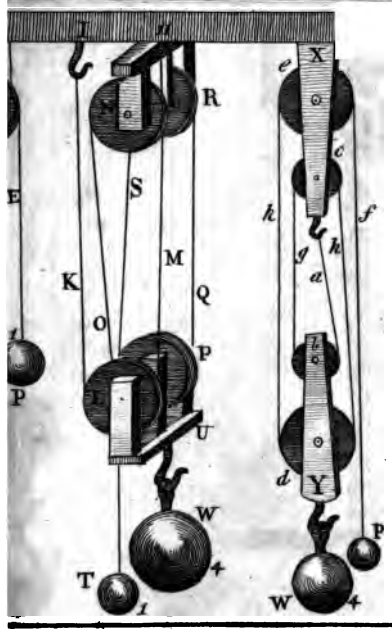
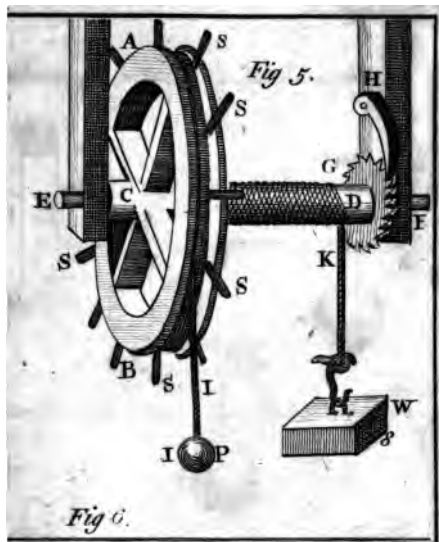
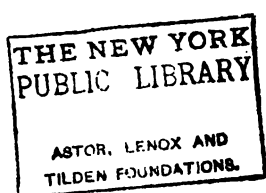


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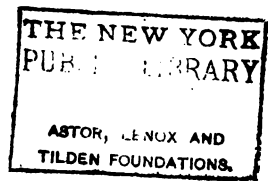
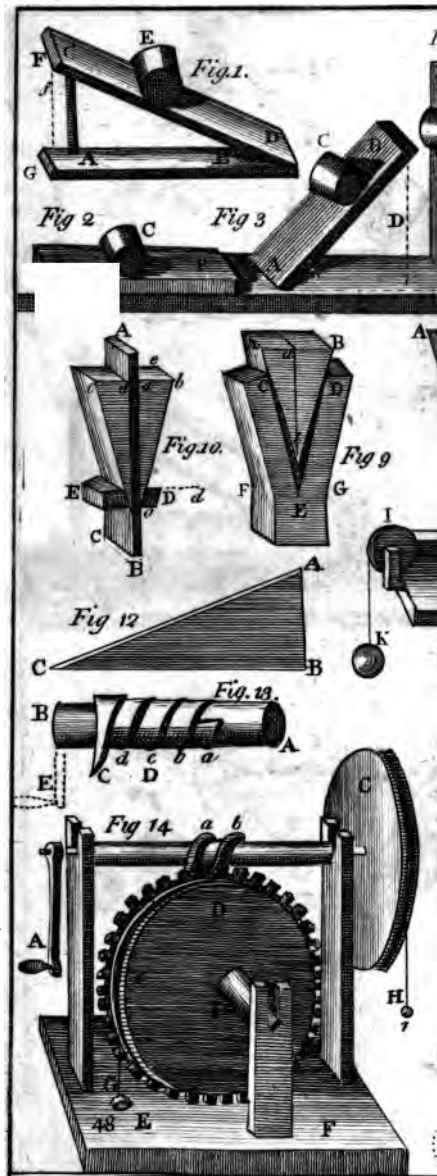


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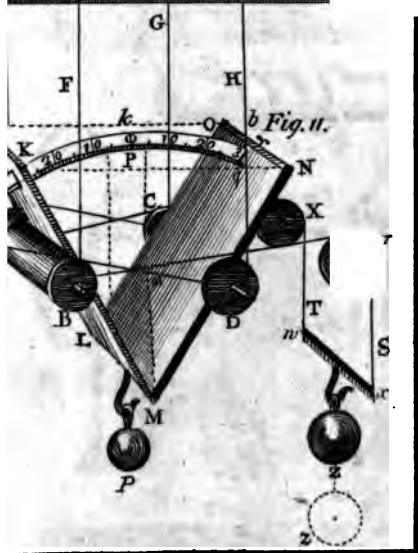
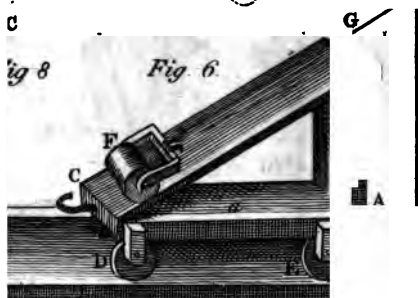
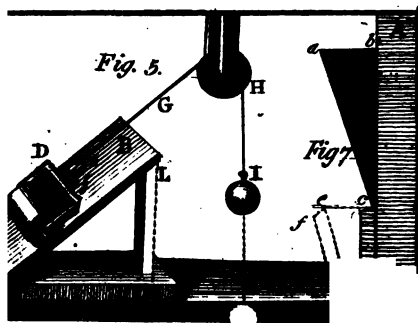
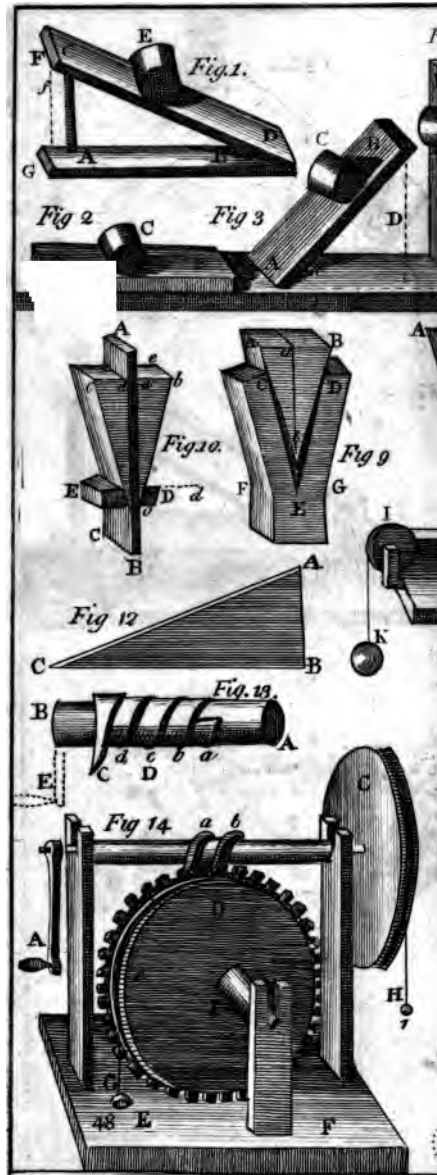
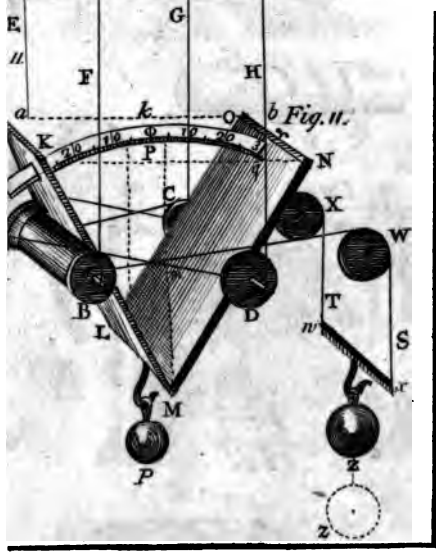
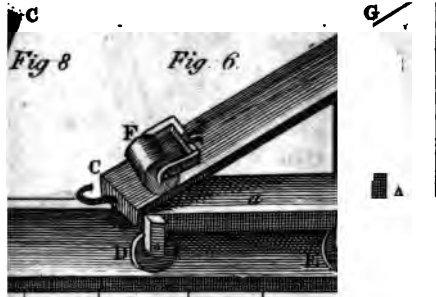
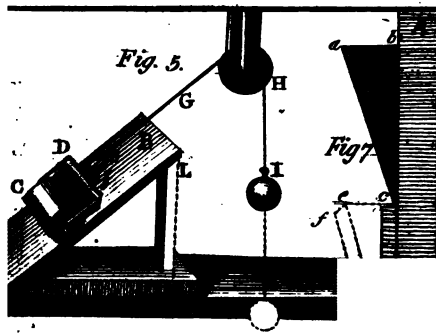
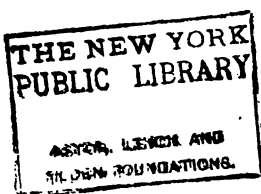


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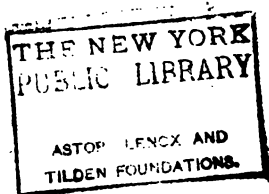
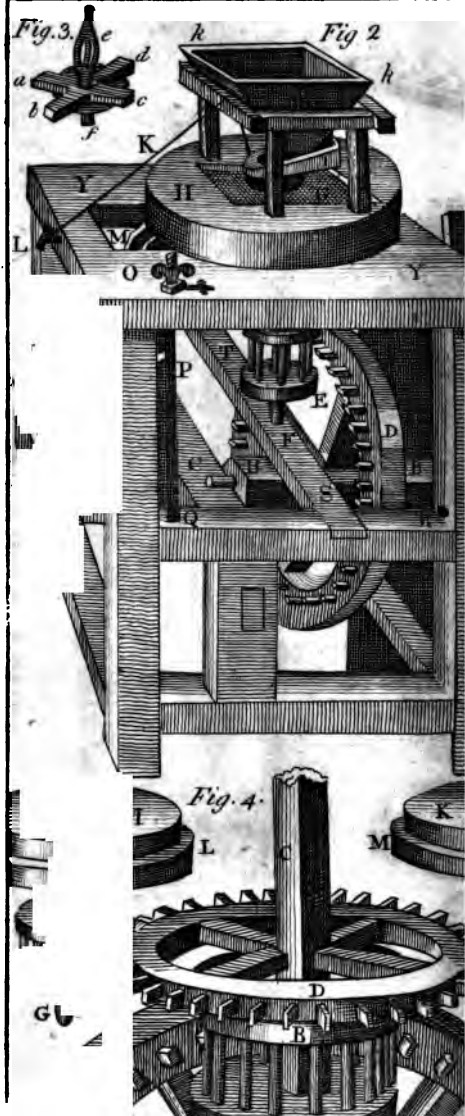
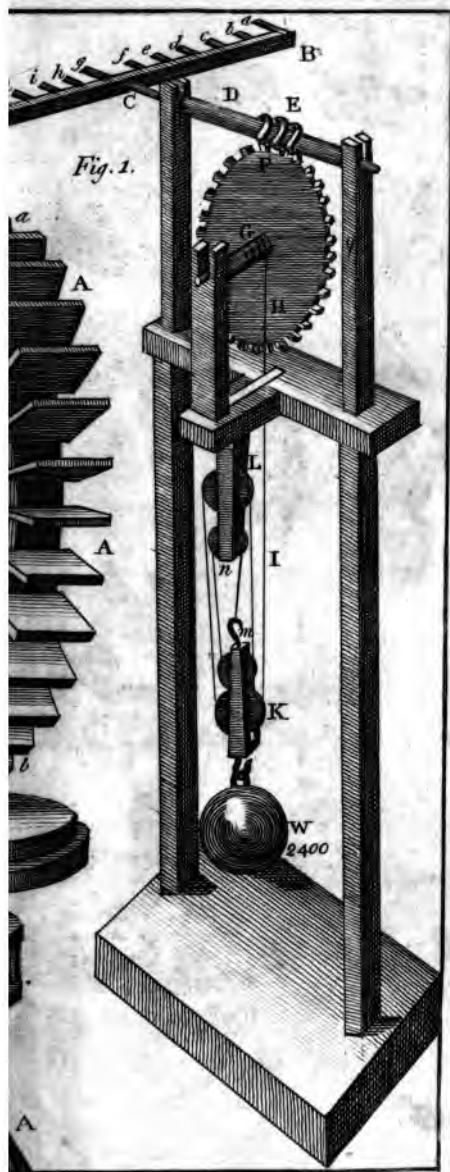


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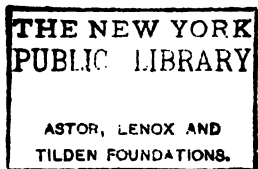


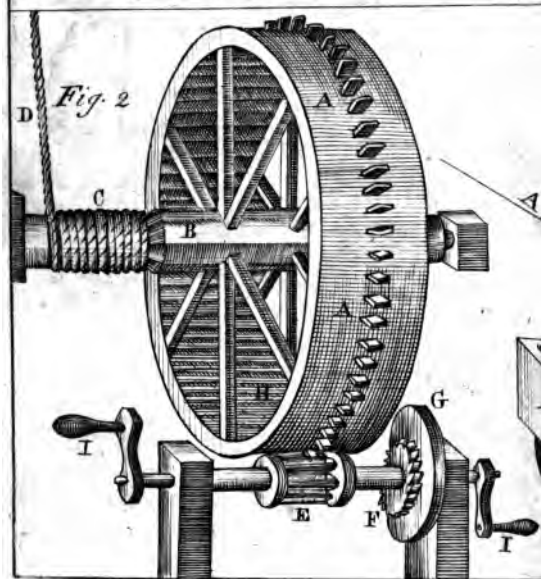
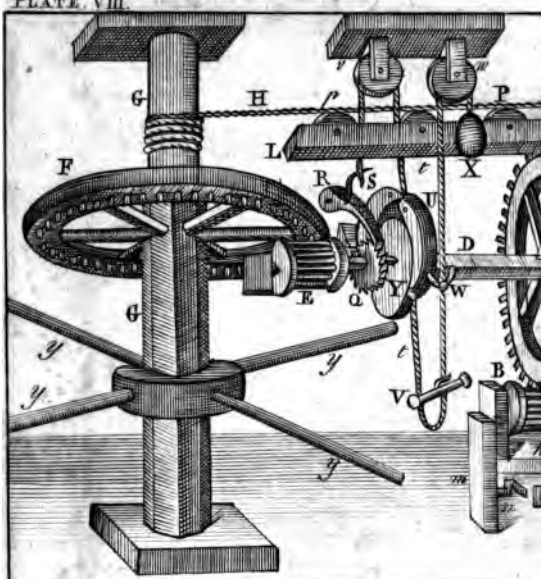


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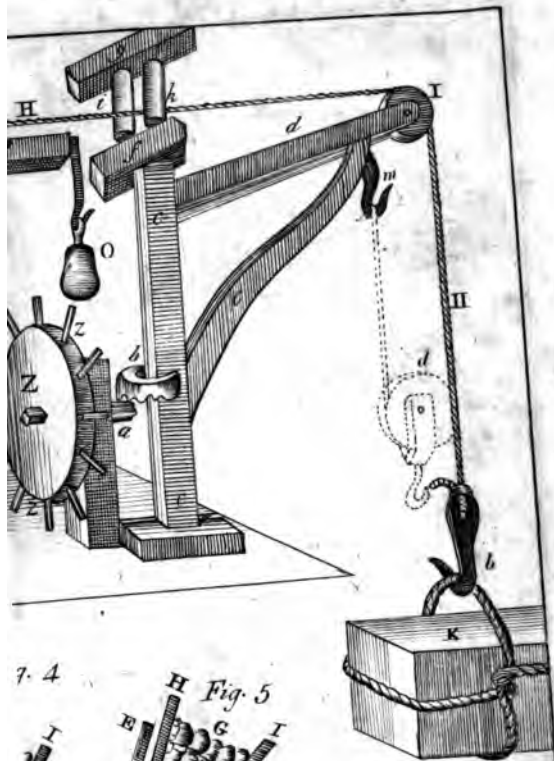
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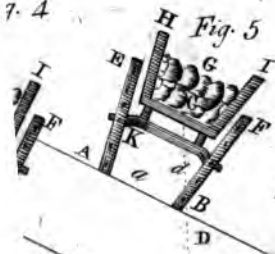


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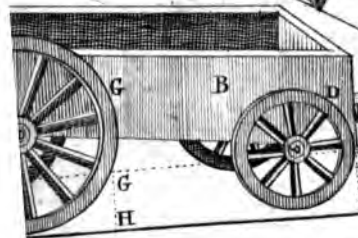
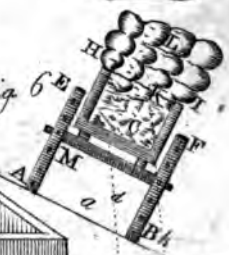


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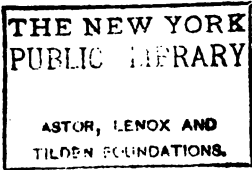
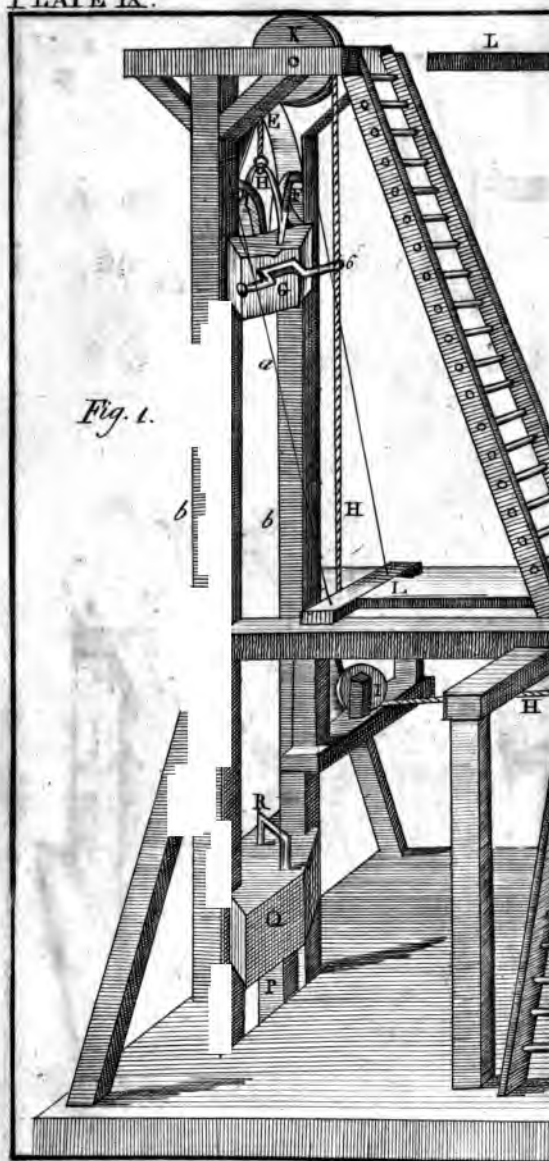
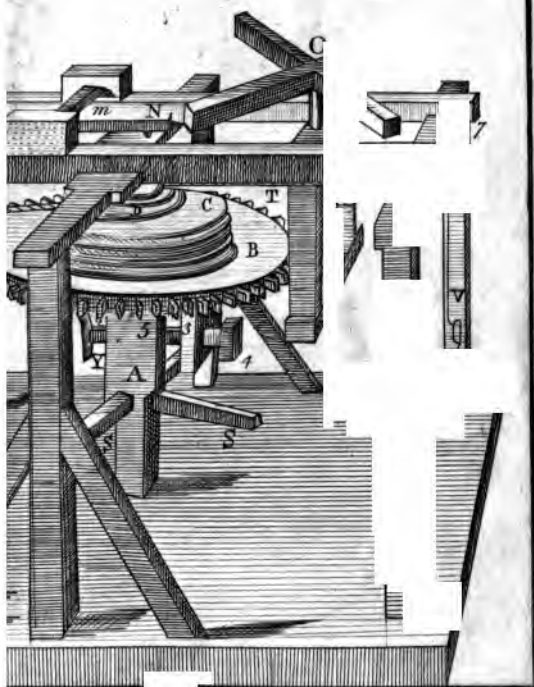
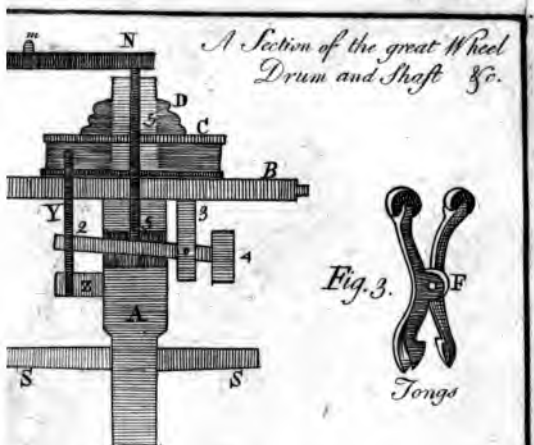


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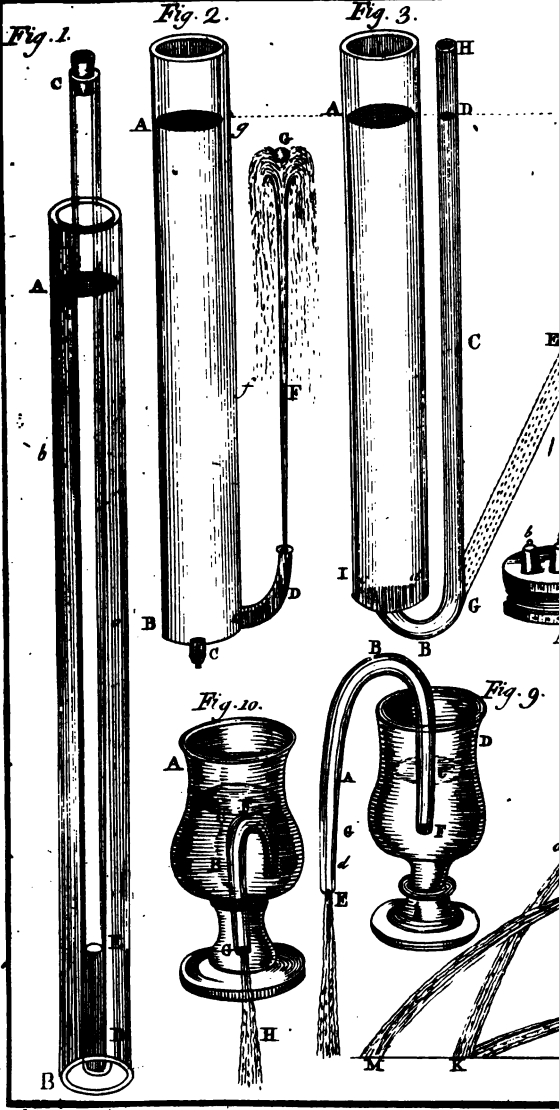
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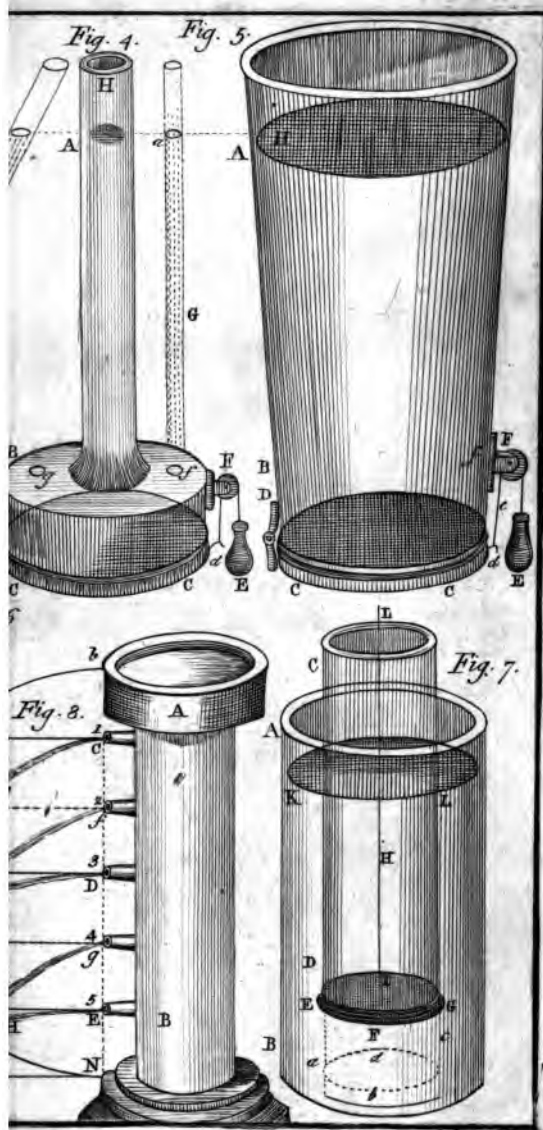
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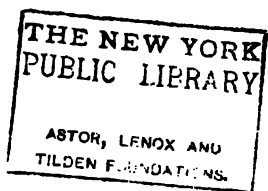
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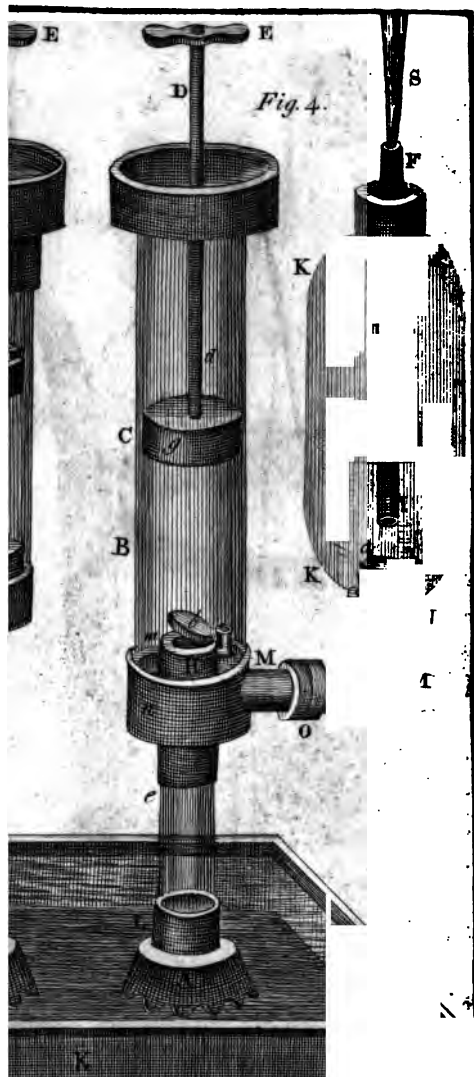
Fig. 1.

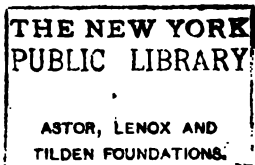


Fig. 2.



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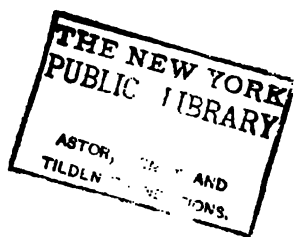
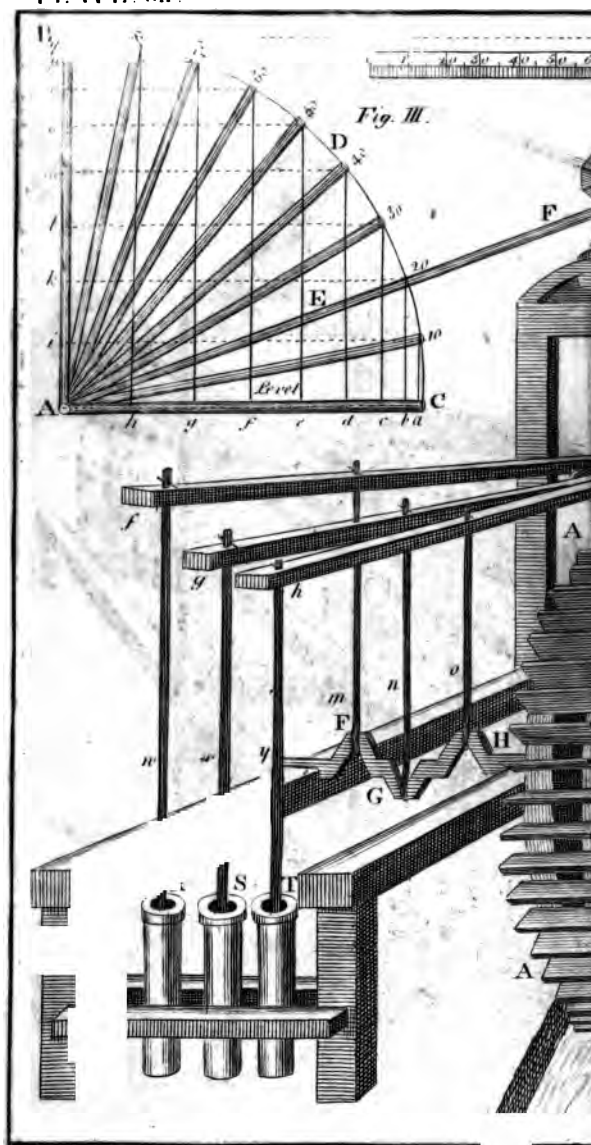
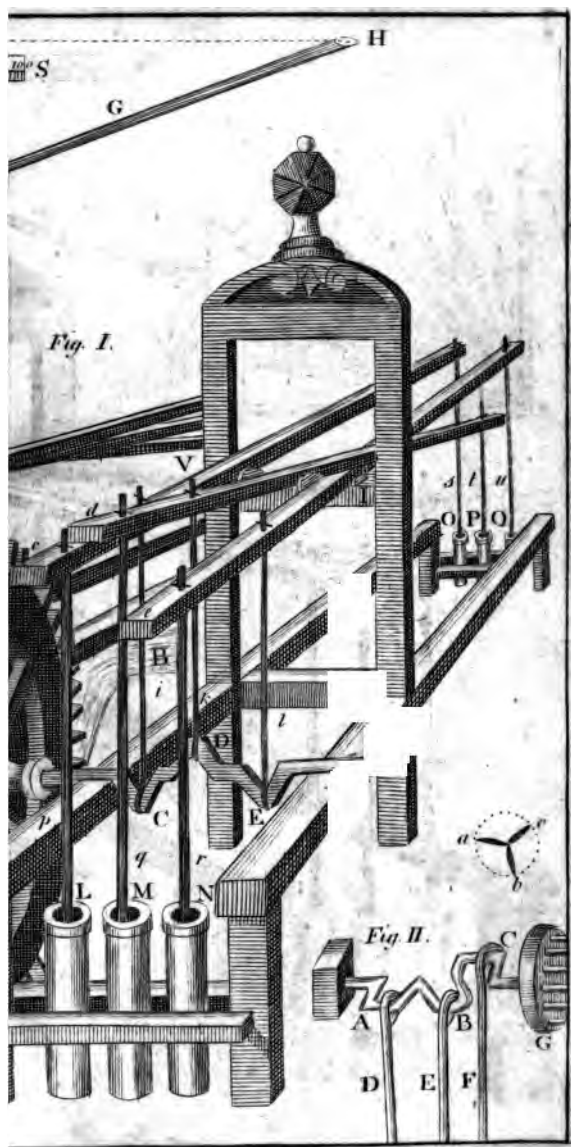


PLATE XII.





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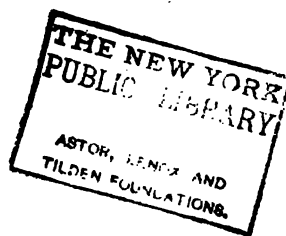
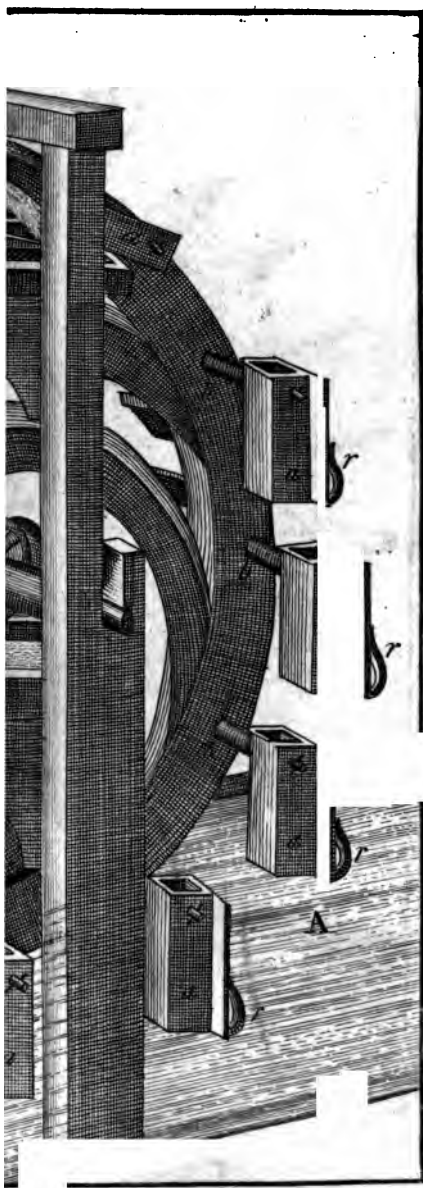
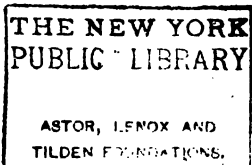


PLATE XIII.





A. Dooditt sc.



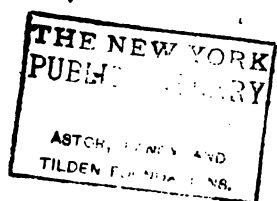
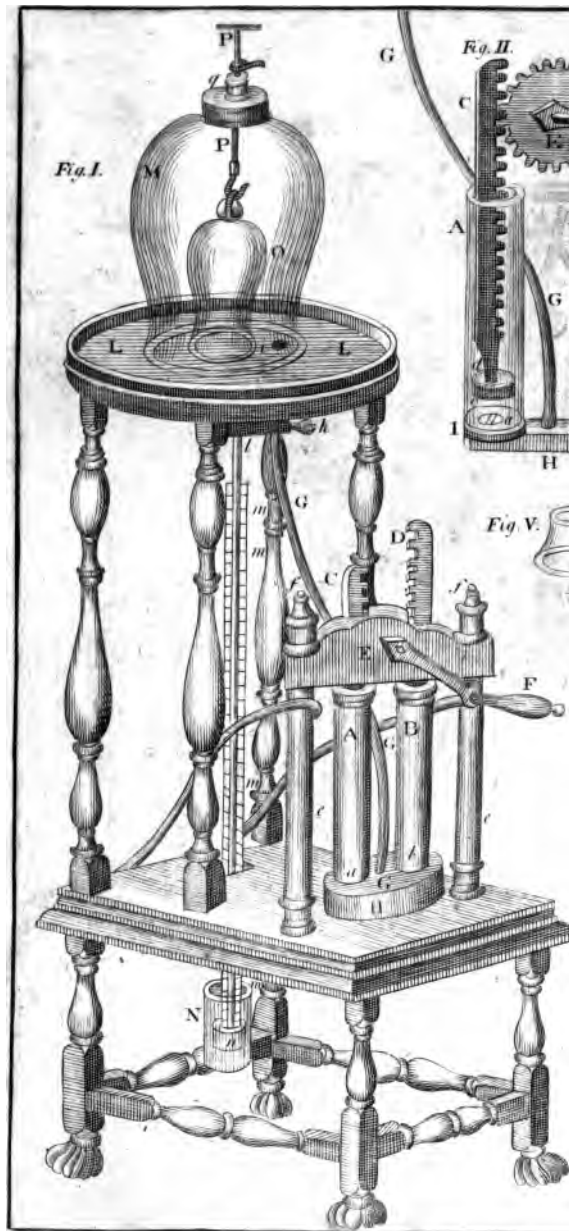
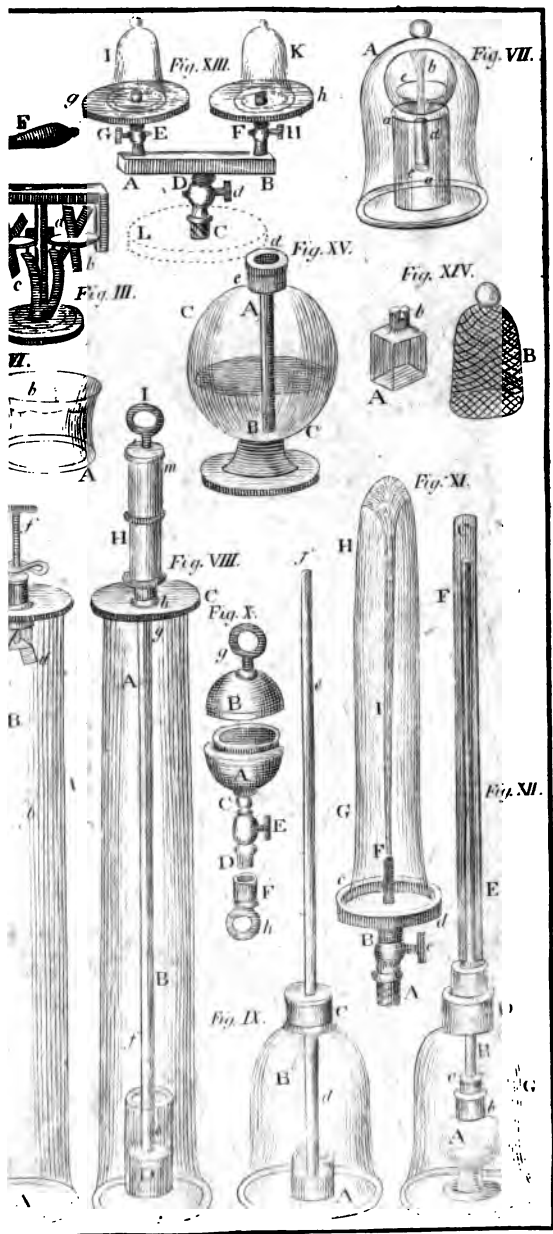
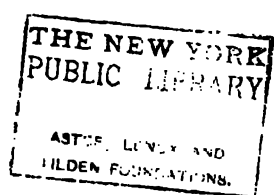


PLATE. XIV.







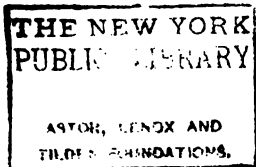
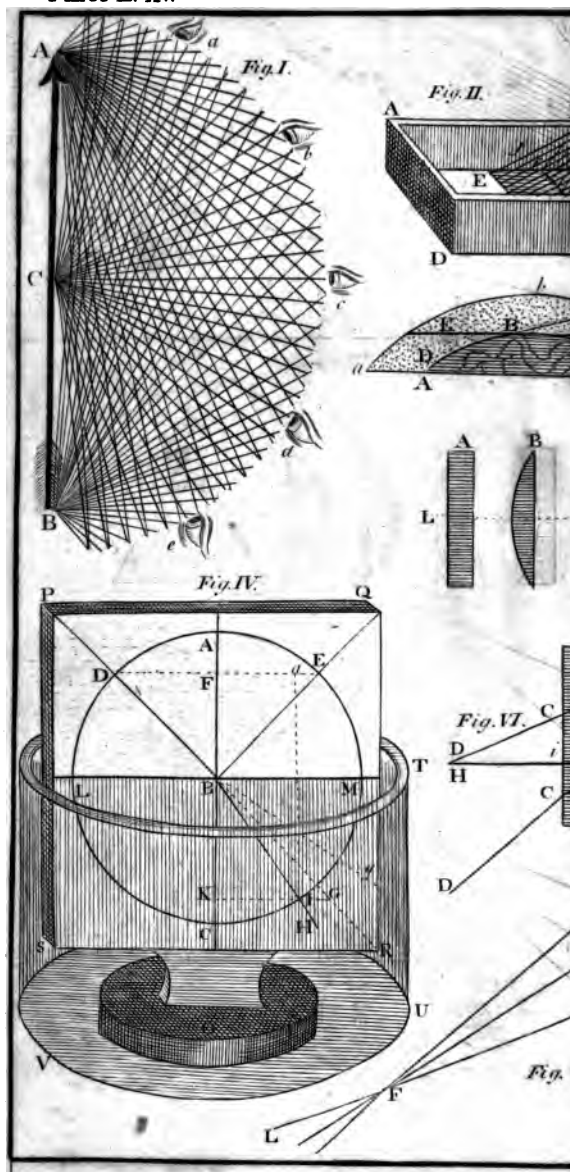
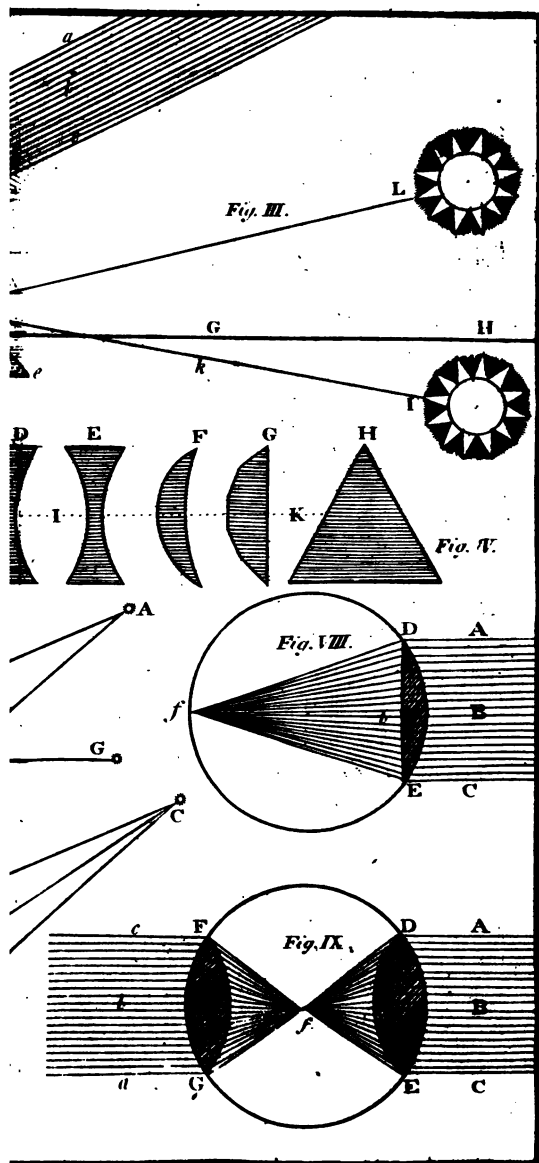


PLATE. XV.



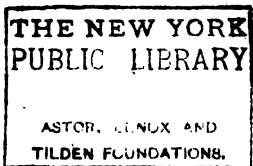


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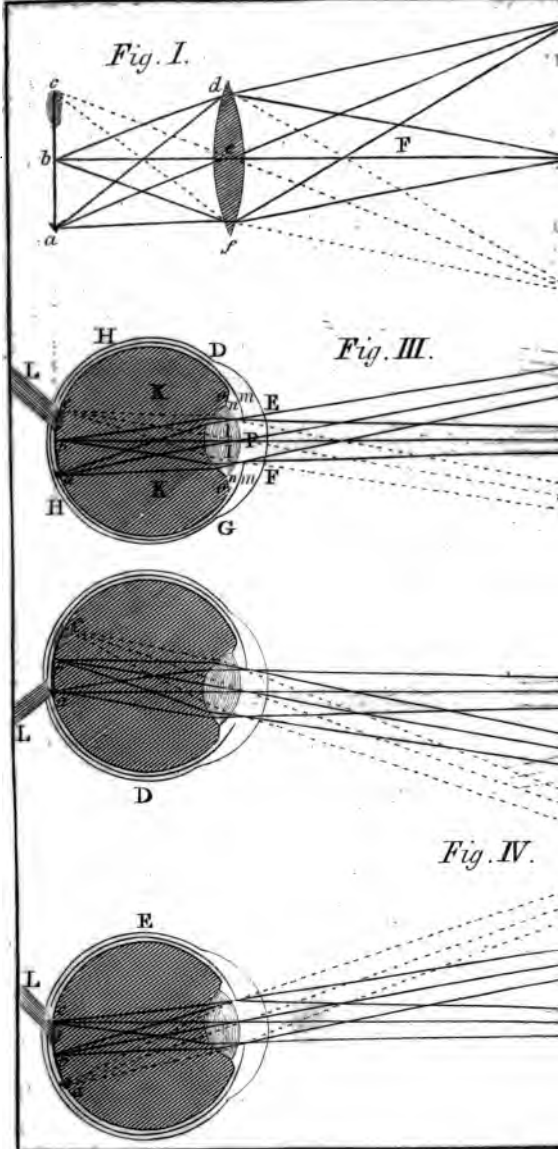
ASTOR, LENOX AND
TILDEN FOUNDATIONS.

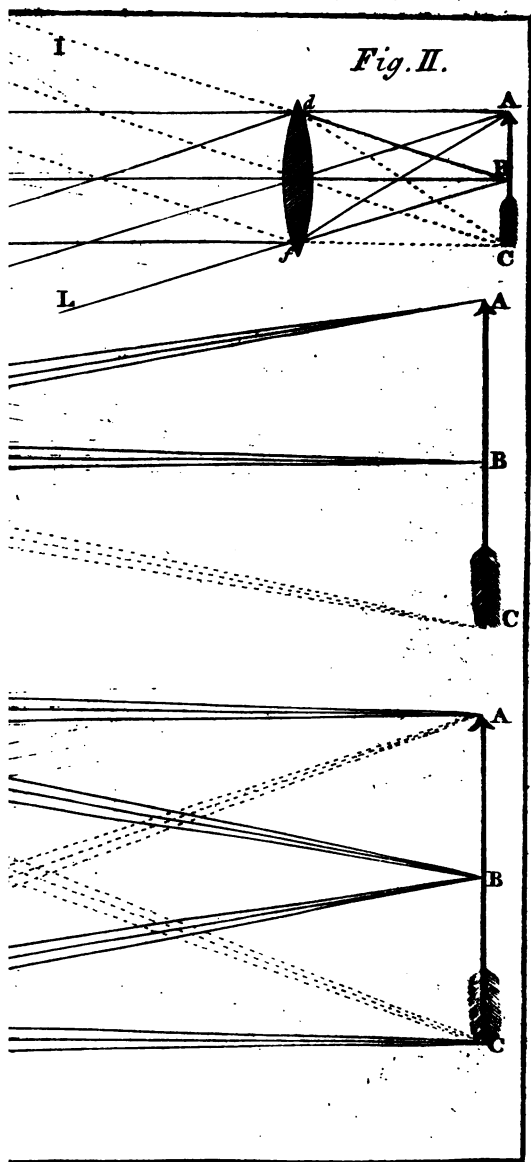


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PLATE XVI.





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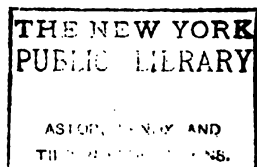
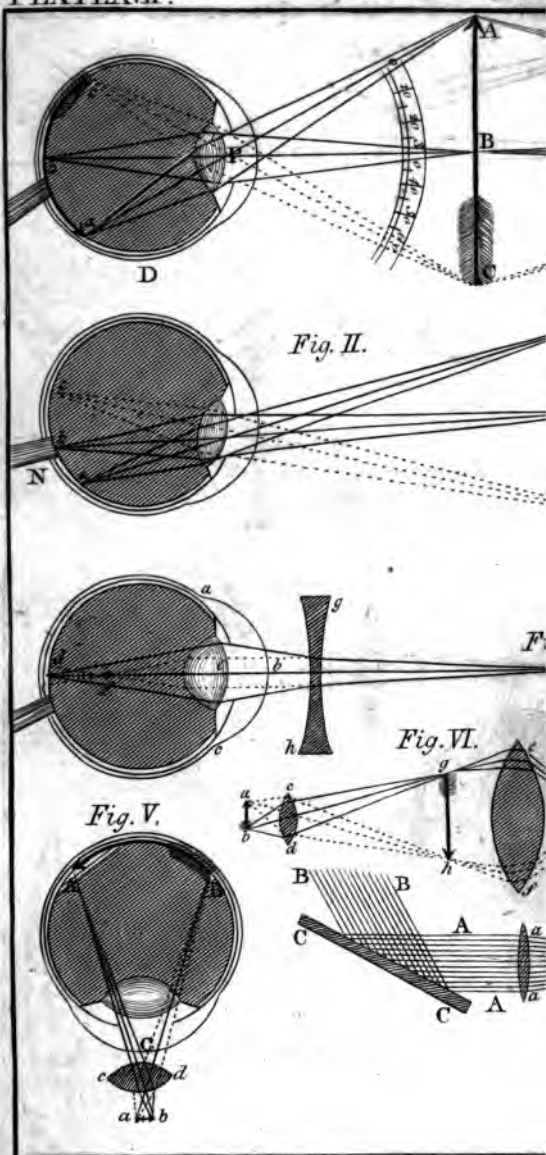
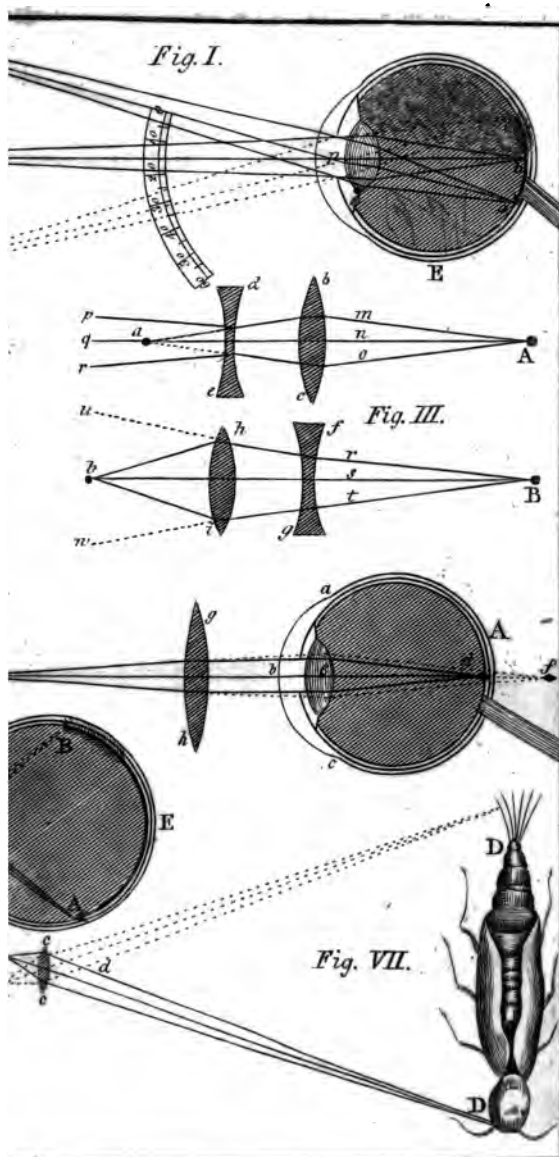


PLATE XVII.





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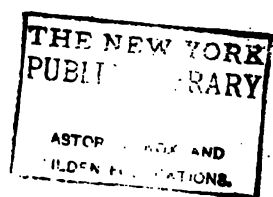
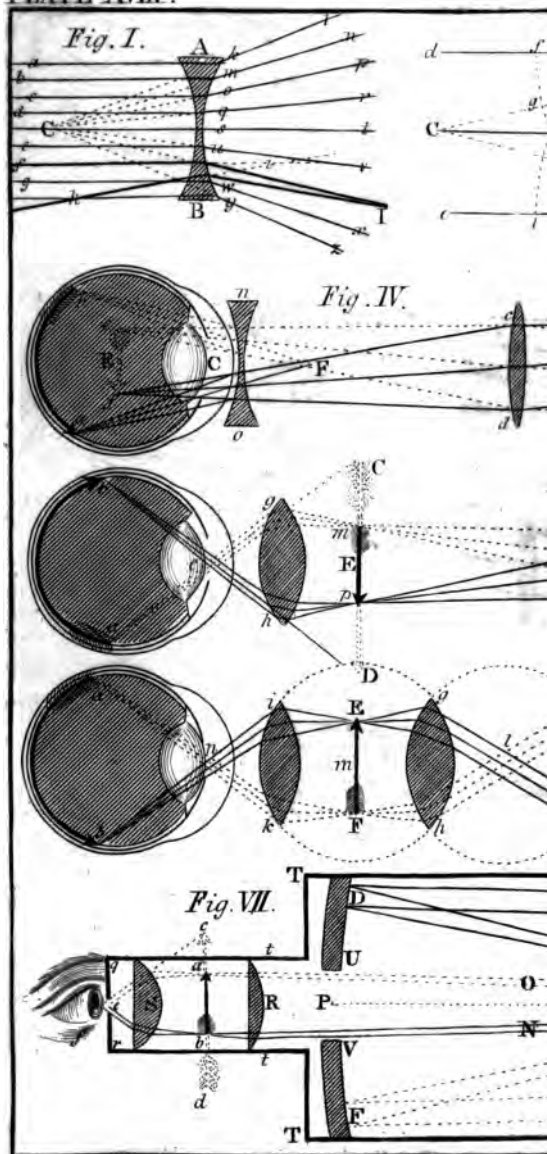
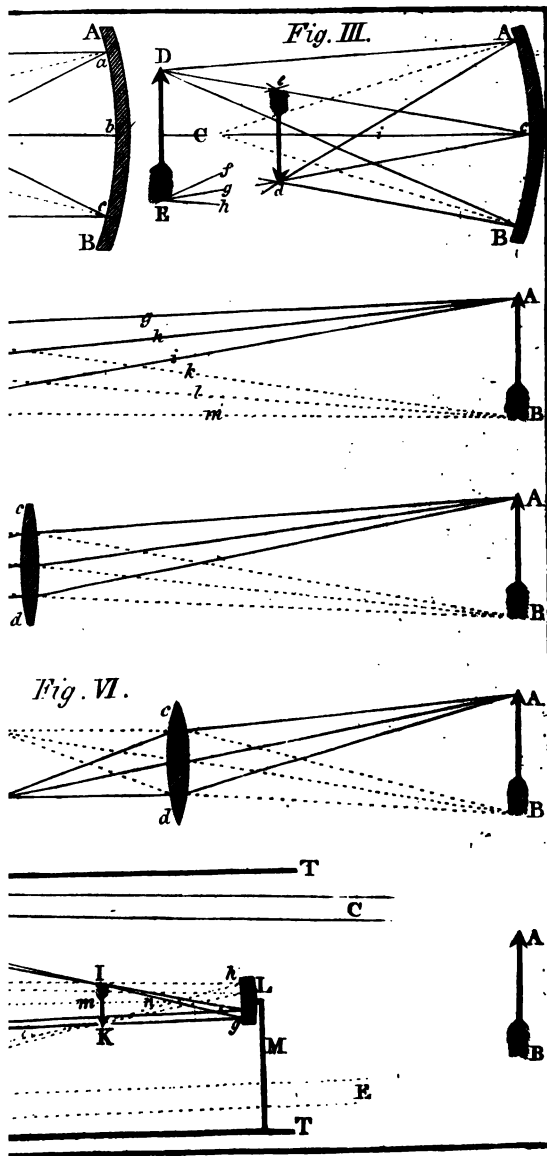


PLATE XVIII.





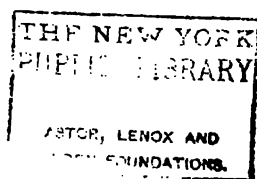
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TILDEN FOUNDATIONS.

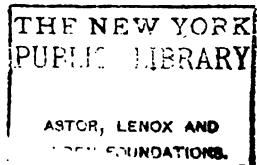


PLATE XVI.

Fig. I.

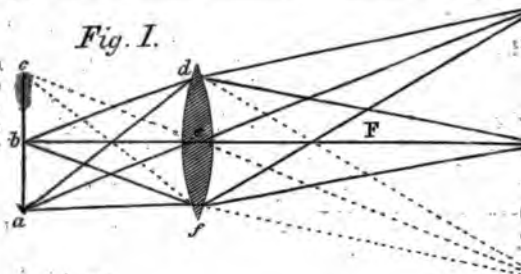


Fig. III.

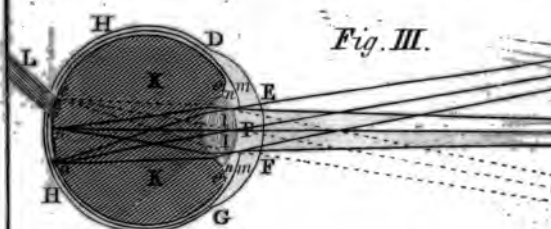
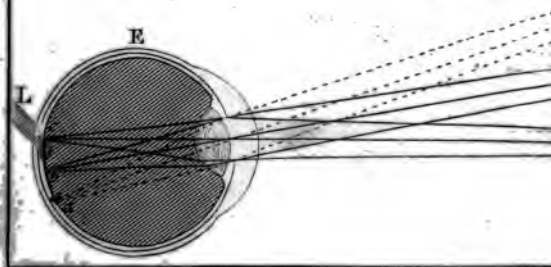
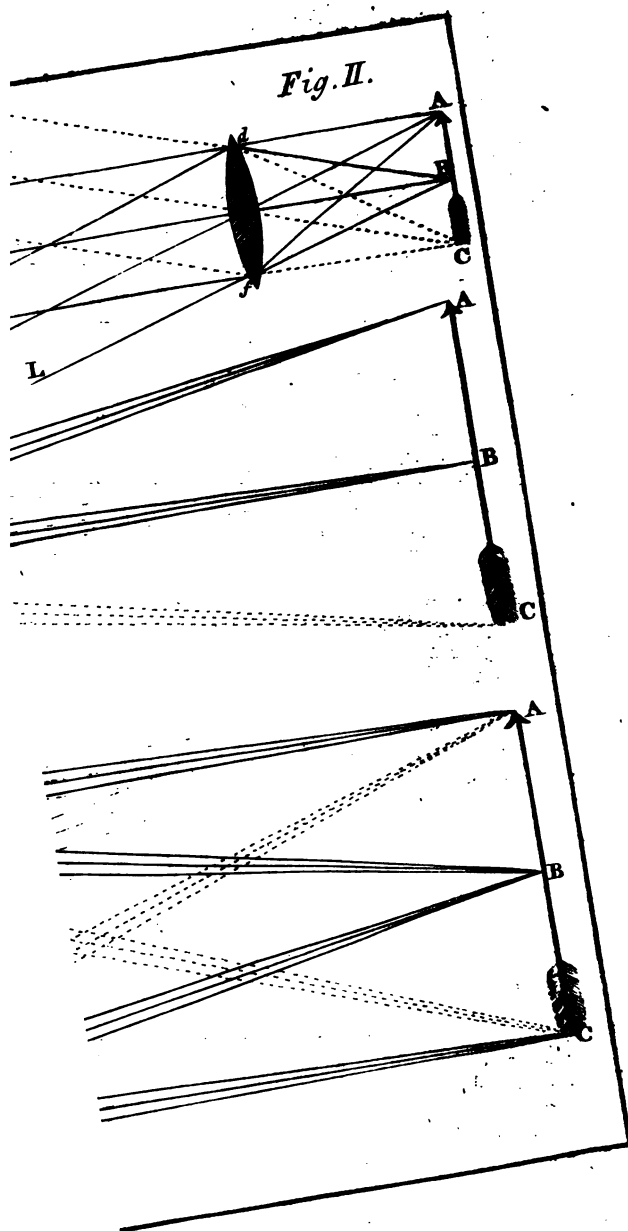
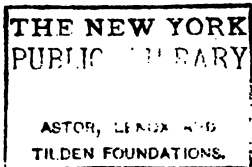


Fig. IV.







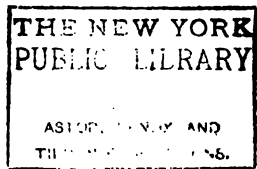
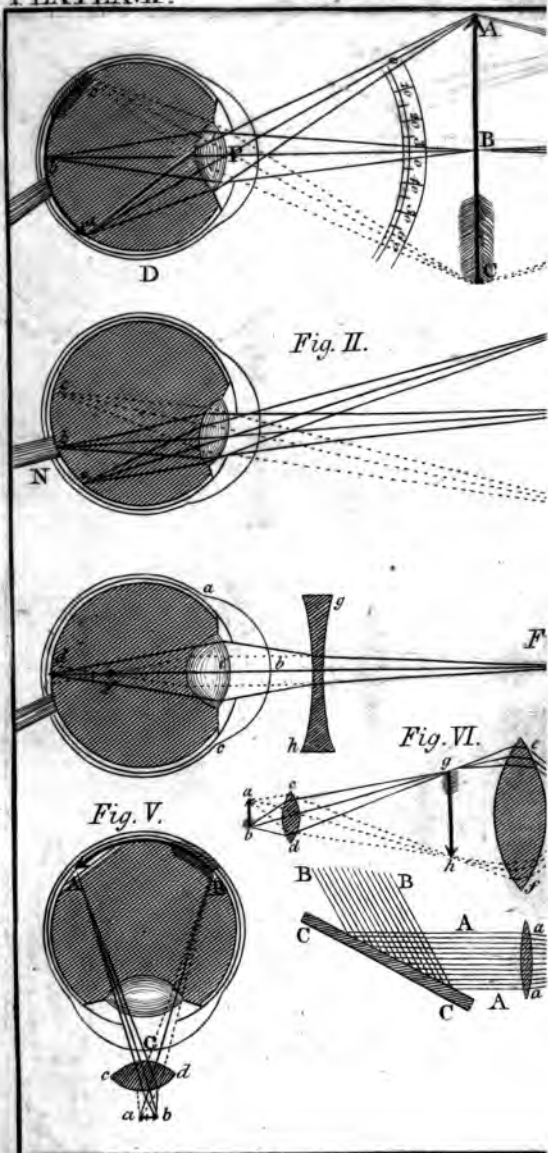
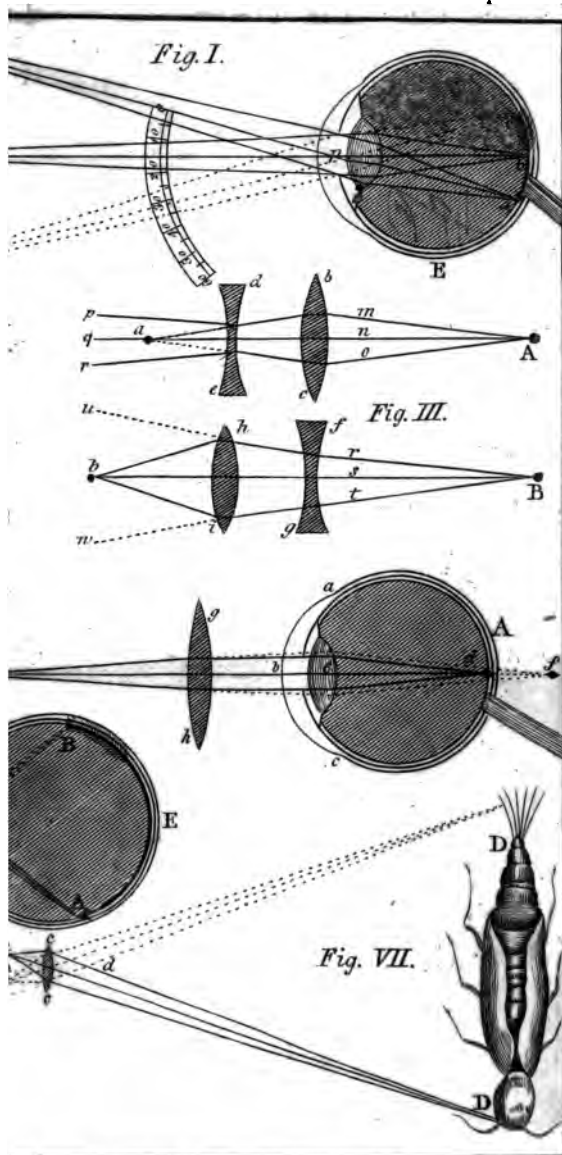


PLATE XVII.





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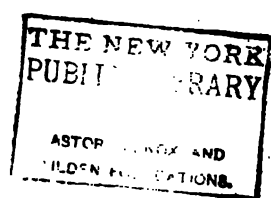
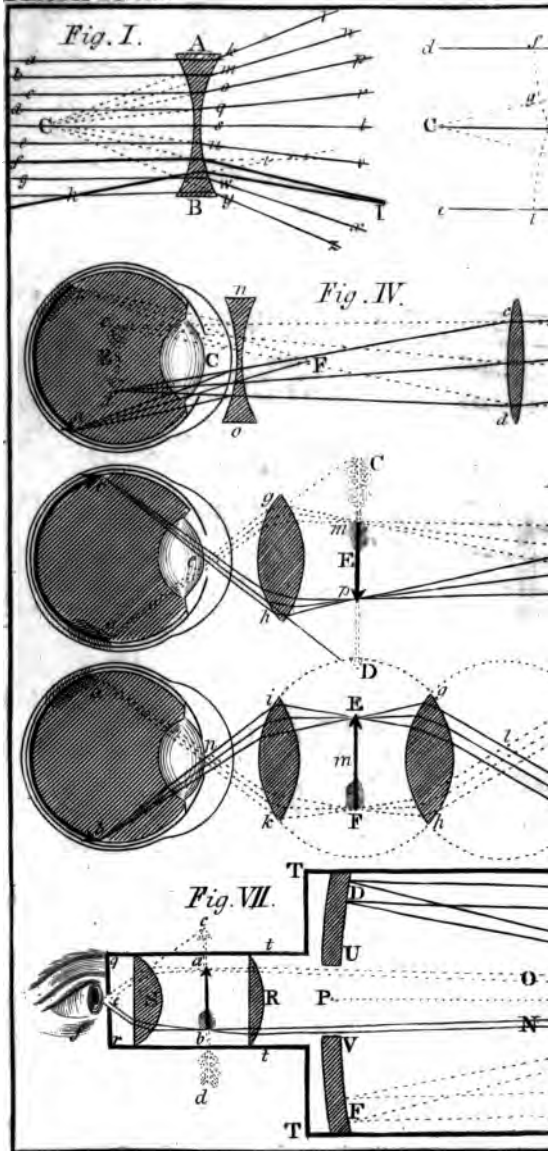
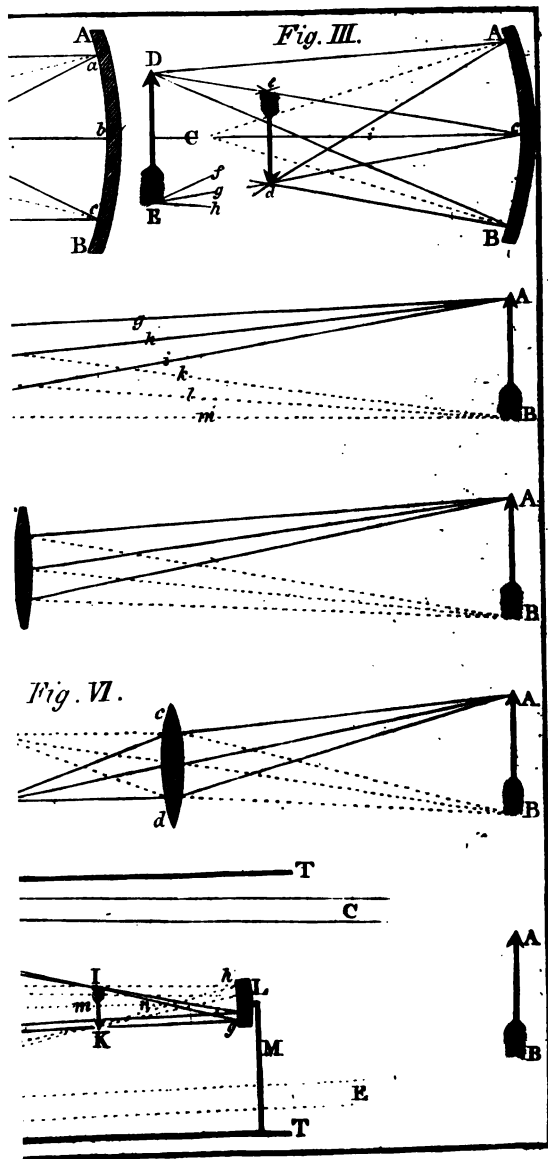


PLATE XVIII.



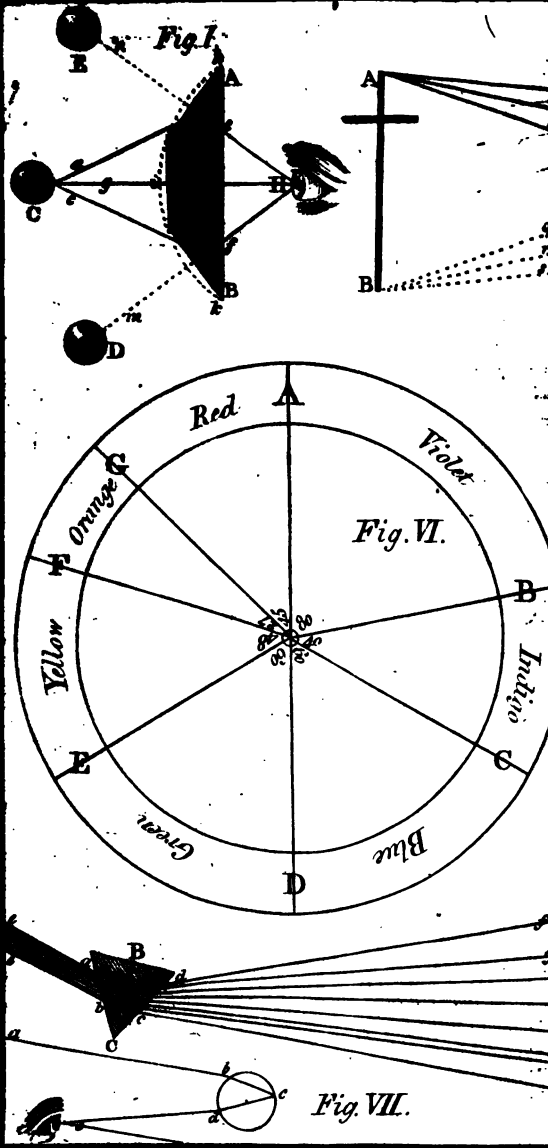


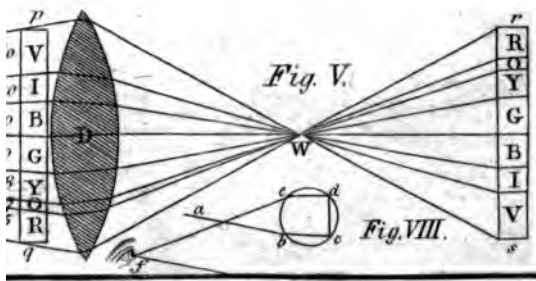
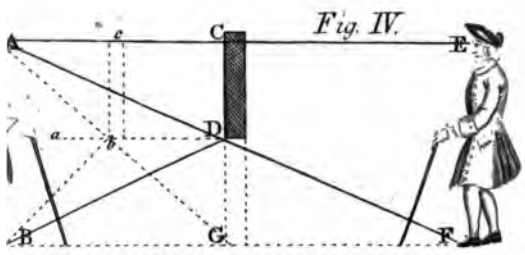
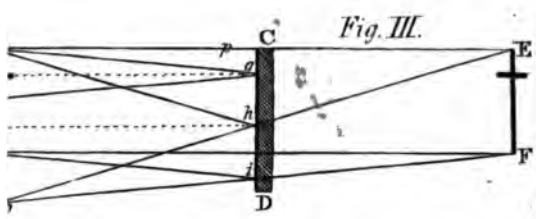
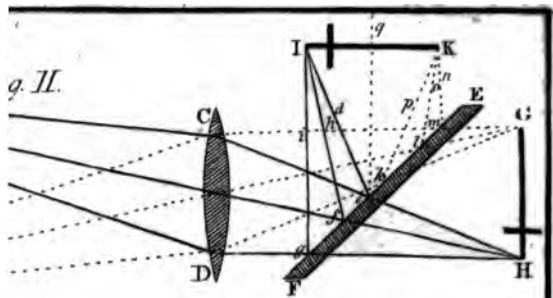
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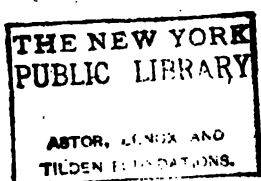
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PLATE XIX







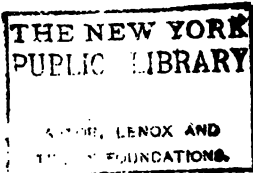
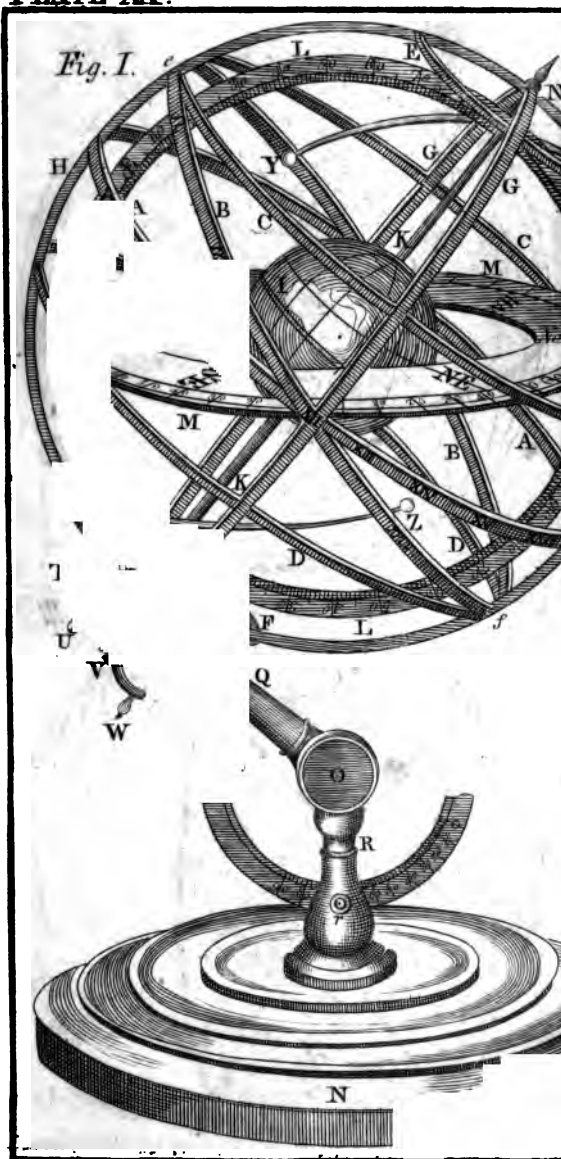
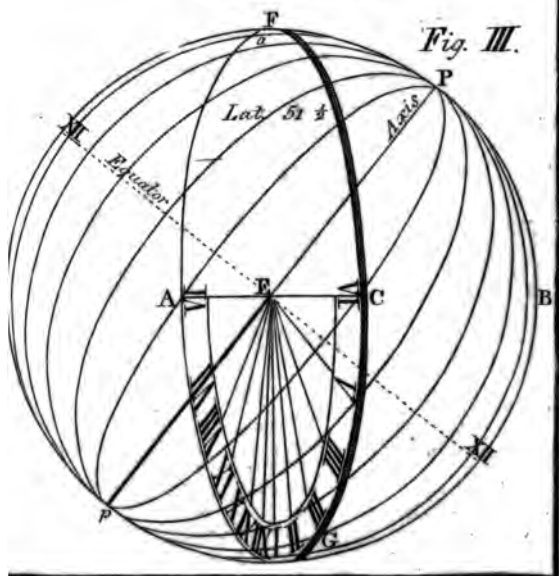
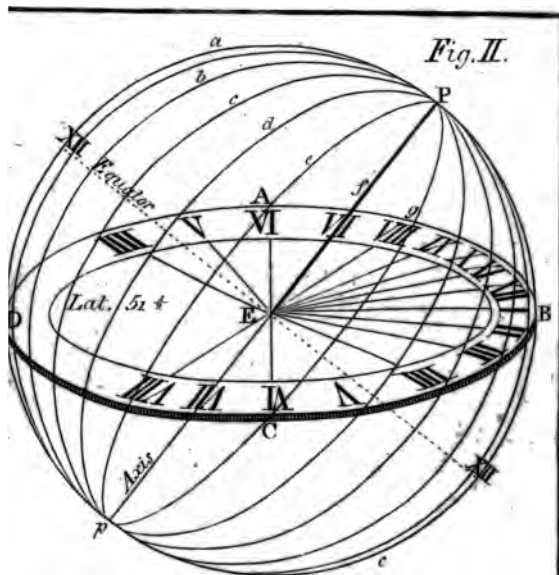
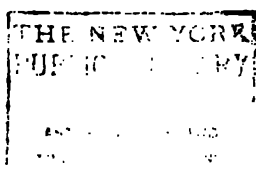


PLATE XX.







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PLATE.XXI.

Fig. I.

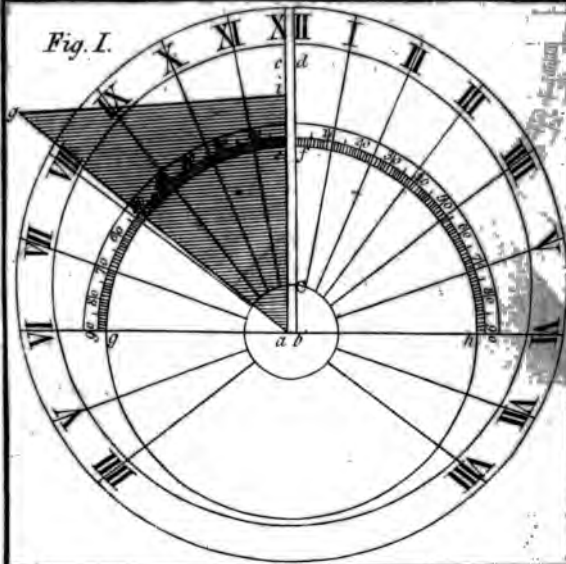
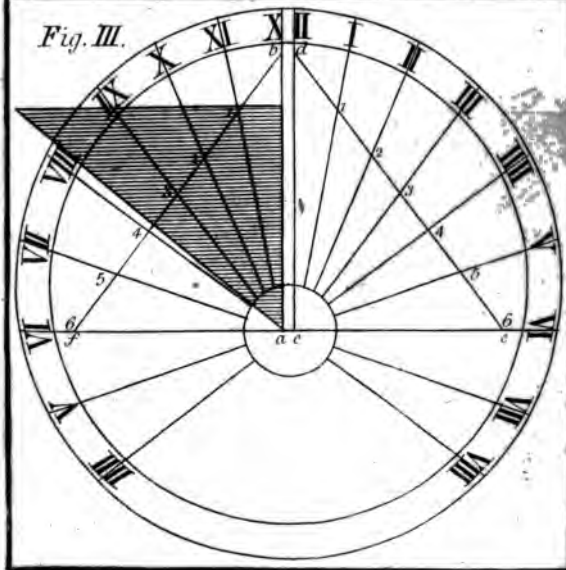
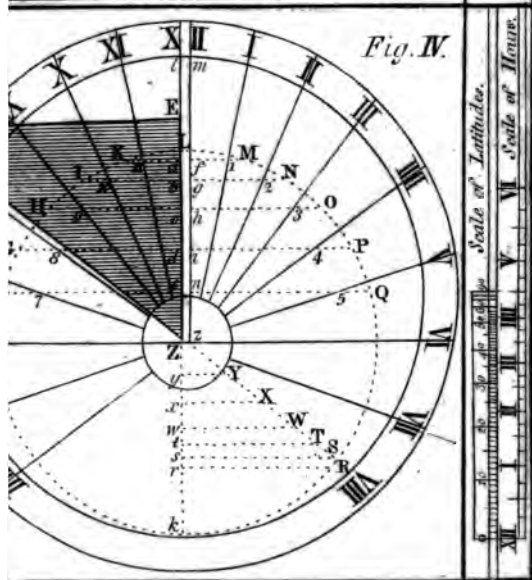
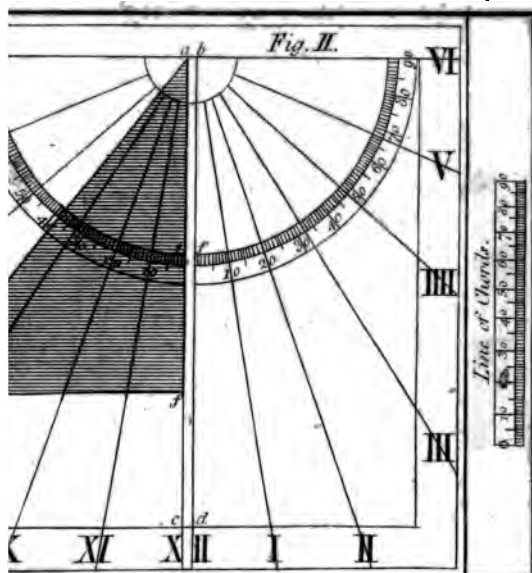
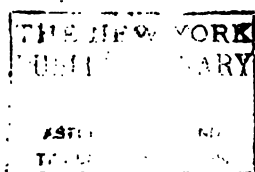


Fig. III.







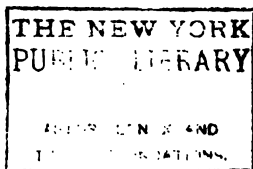


PLATE XXII

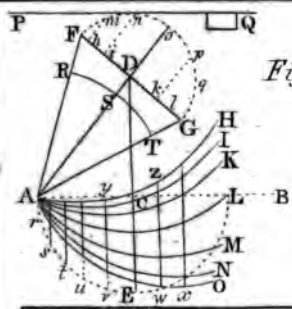
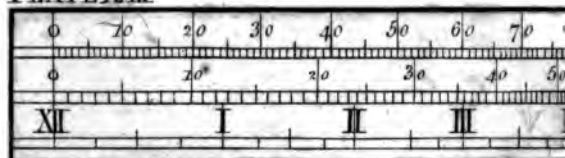


Fig. III.



Fig. IV.

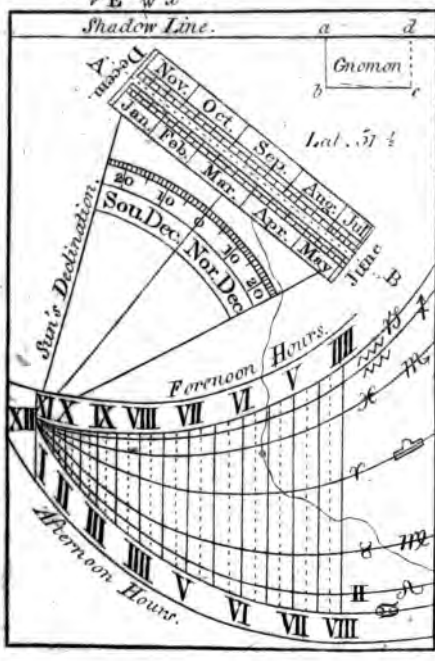
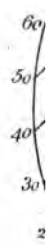


Fig. I.

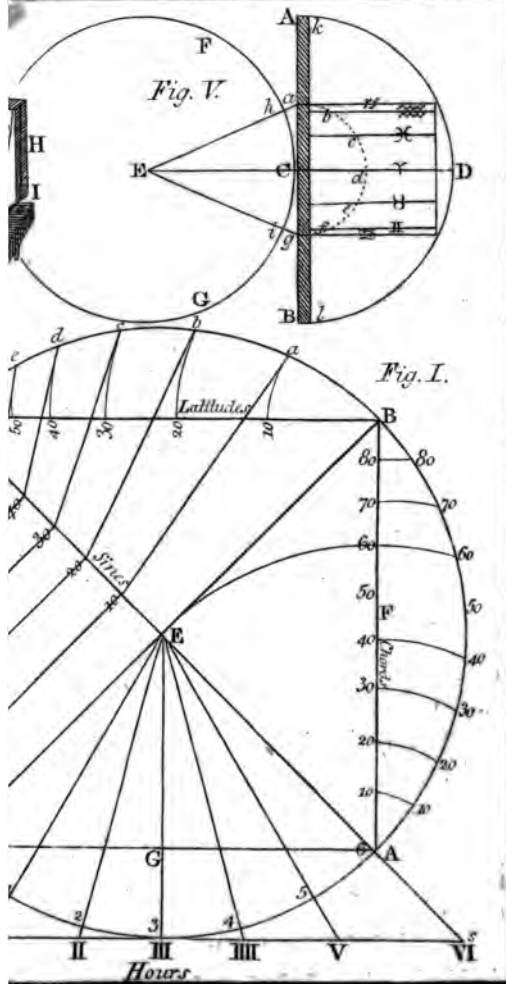


The Line of Chords.

The Line of Latitudes.

VI

The Line of Hours.



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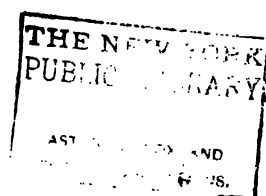
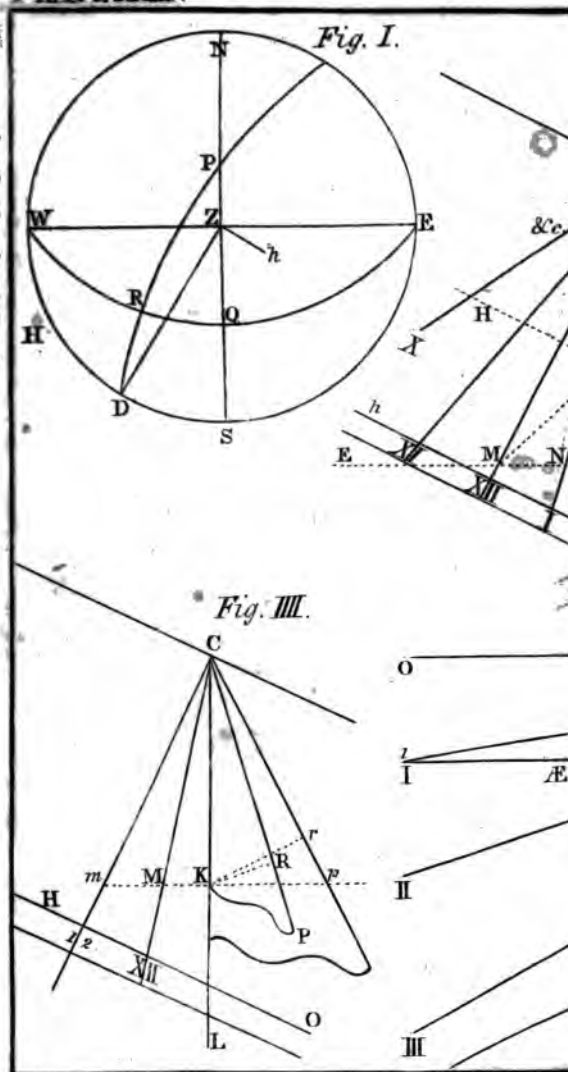
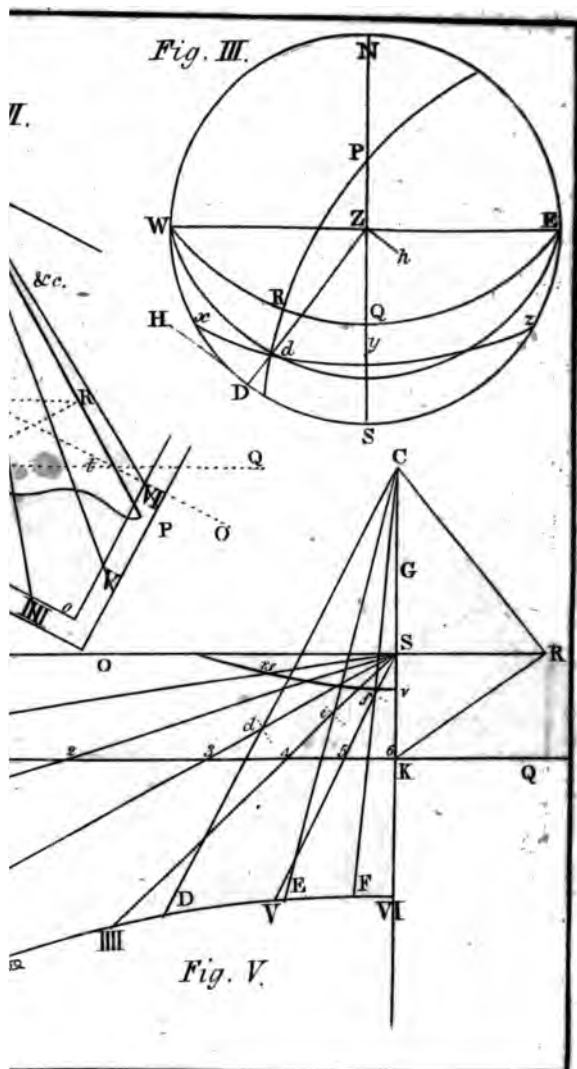
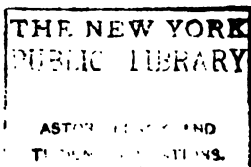


PLATE XXIII.







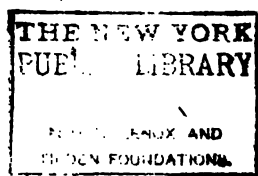
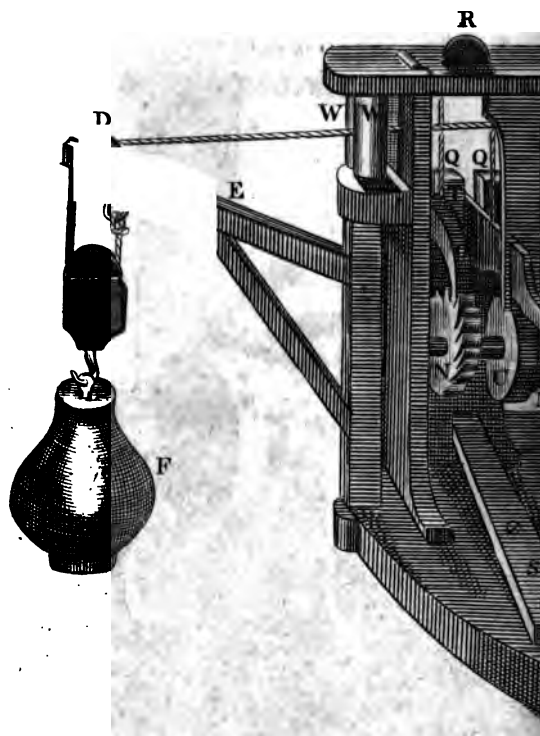
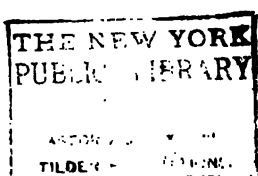


PLATE XXIV.



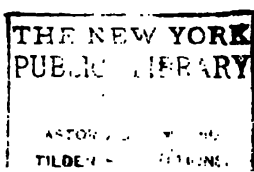
Sup.





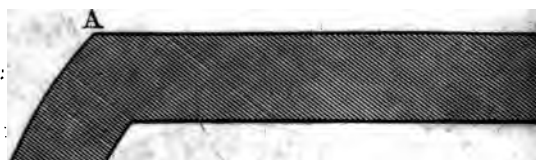
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PLATE XXV.



a

F



b

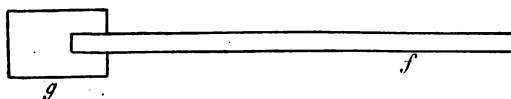


Fig. I.

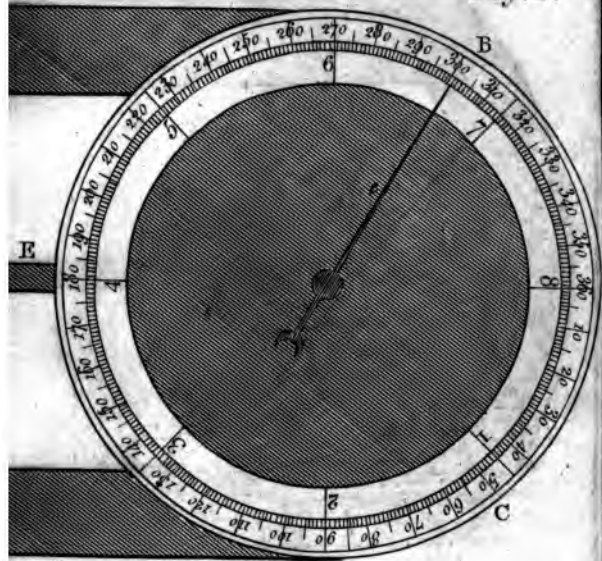
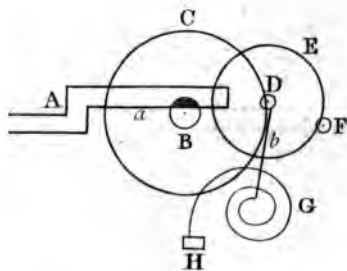
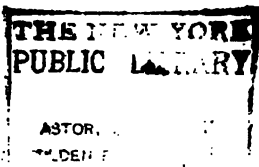


Fig. II.



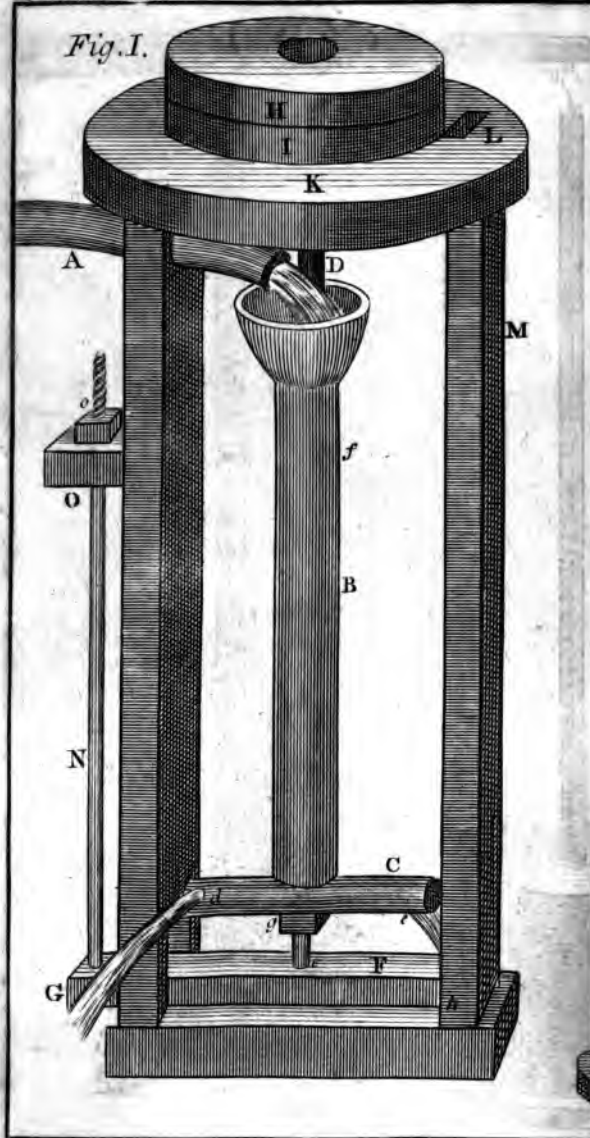


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PLATE XXVI.

Fig. I.



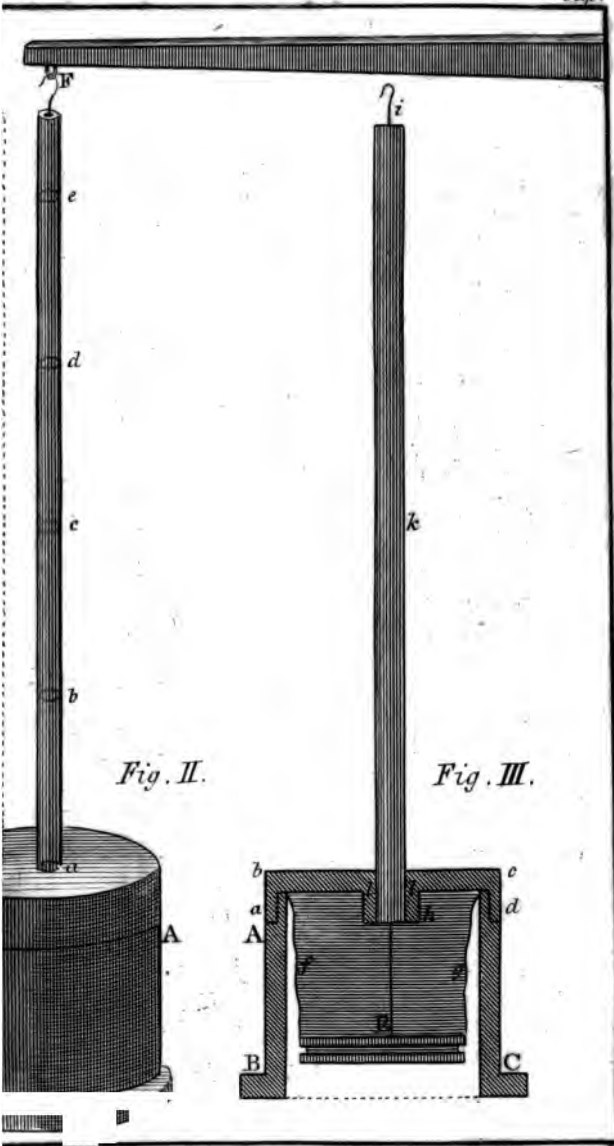
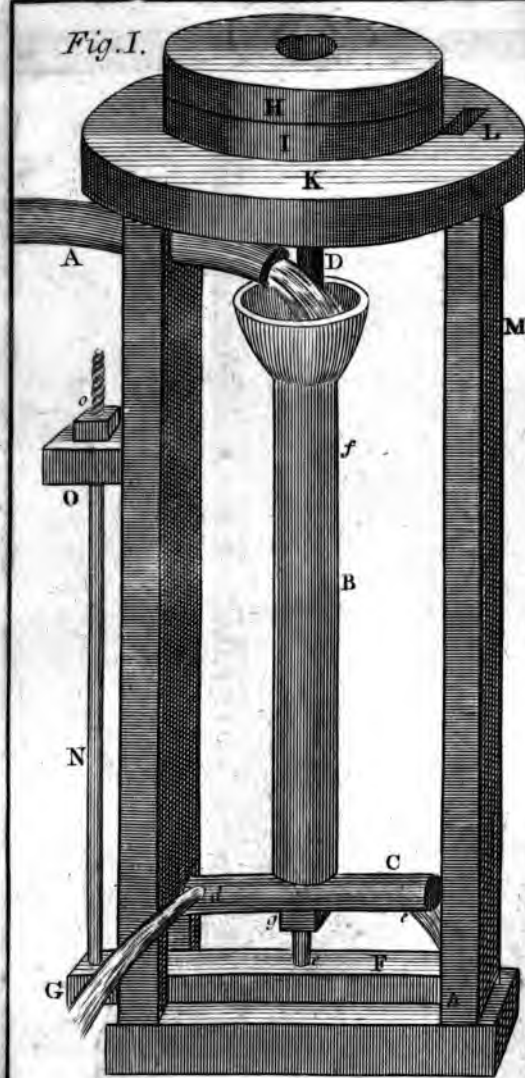
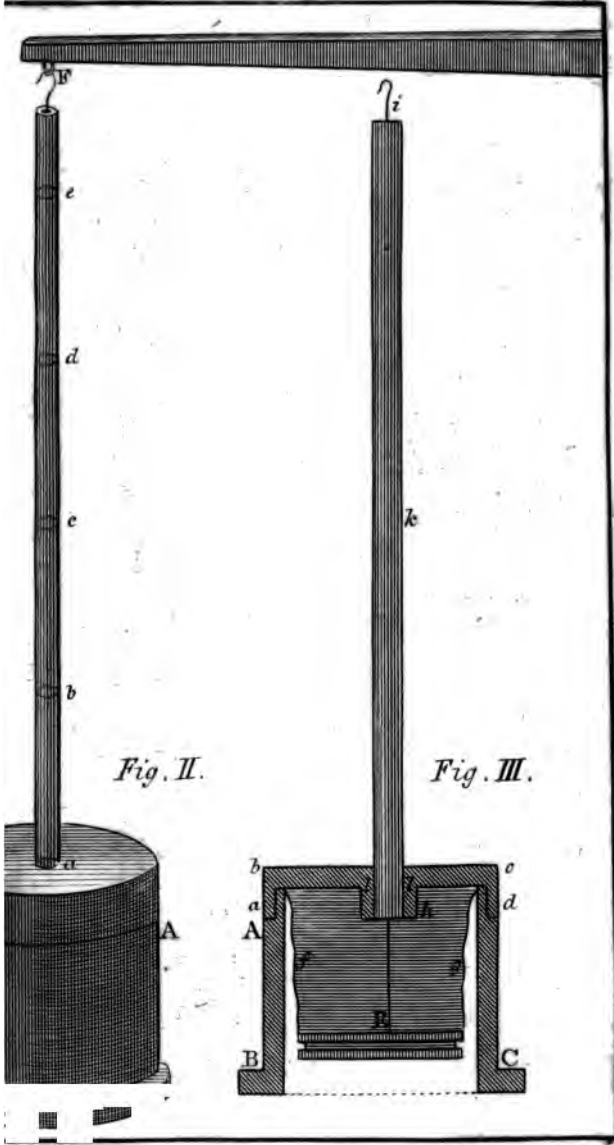


PLATE XXVI.

Fig. I.





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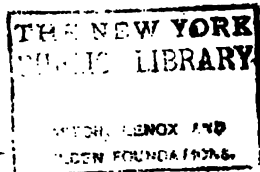


PLATE XXVII.

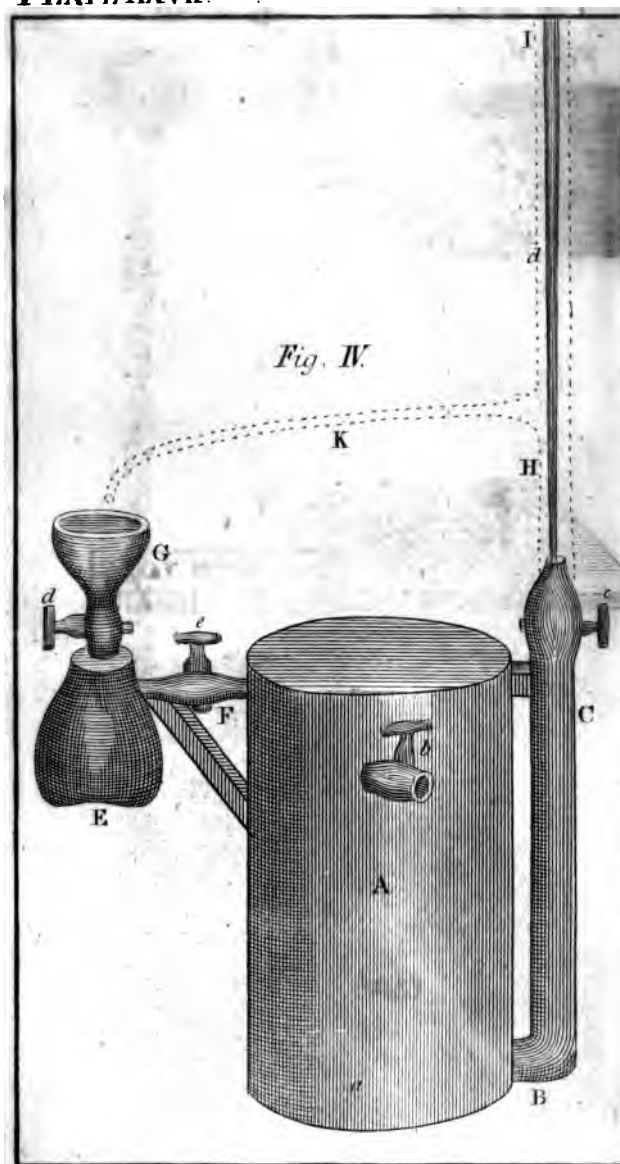


Fig. II.

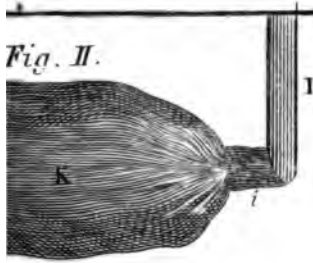


Fig. III.

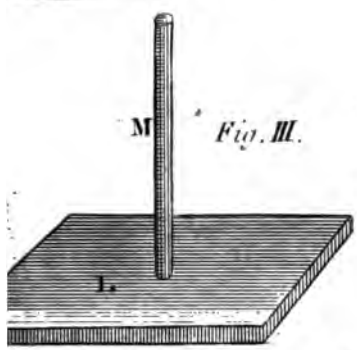
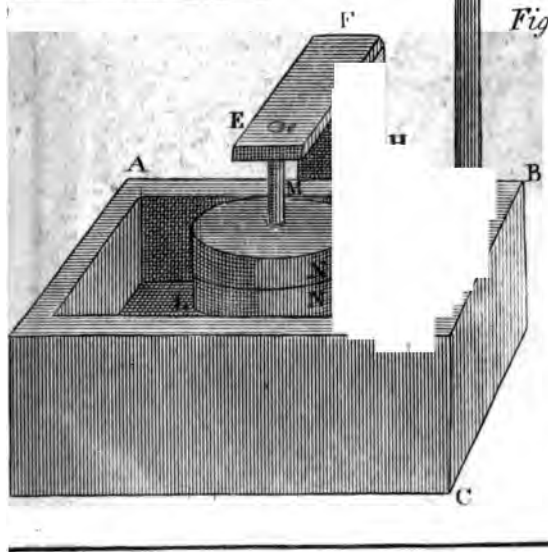


Fig. I.



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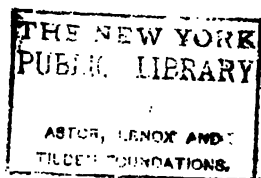


PLATE XXVIII.

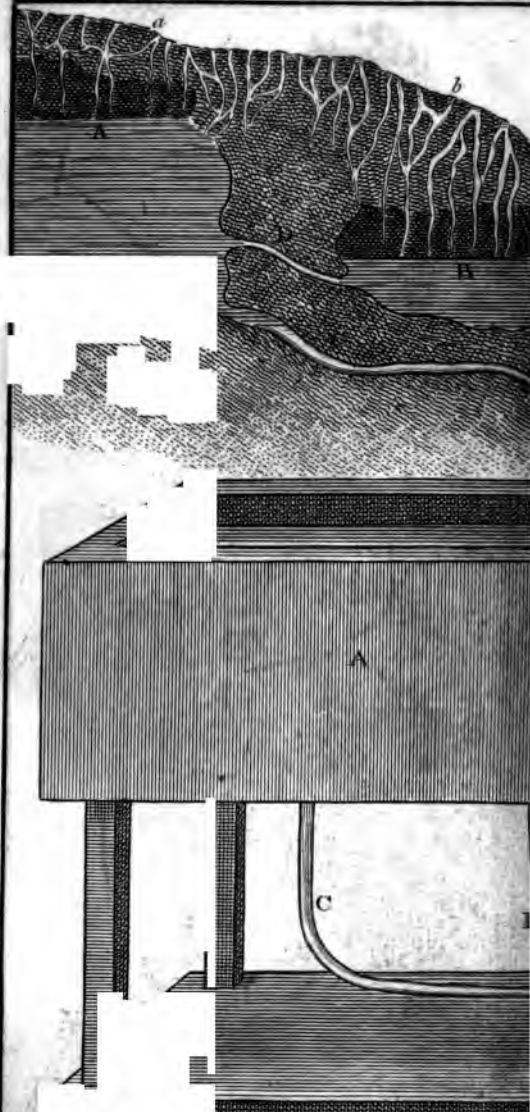


Fig. I.

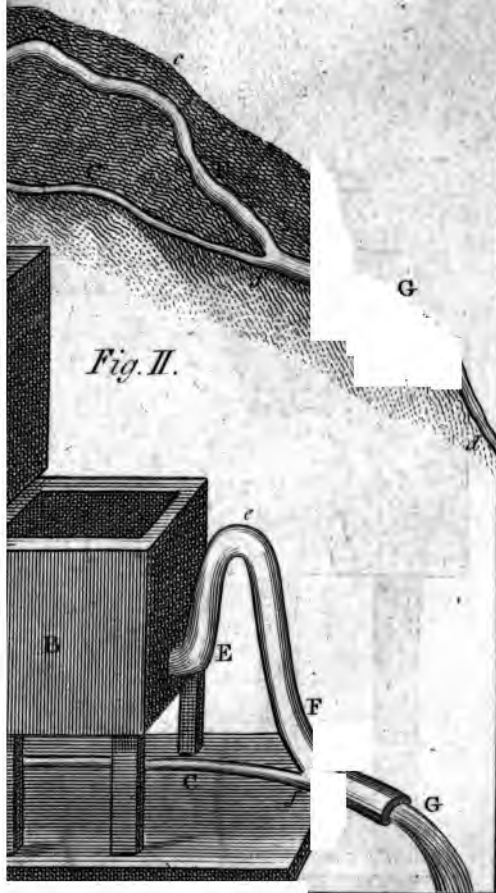
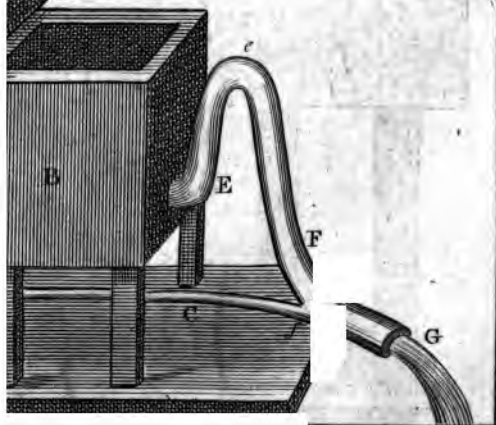


Fig. II.



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PLATE XXX.

Fig. III.



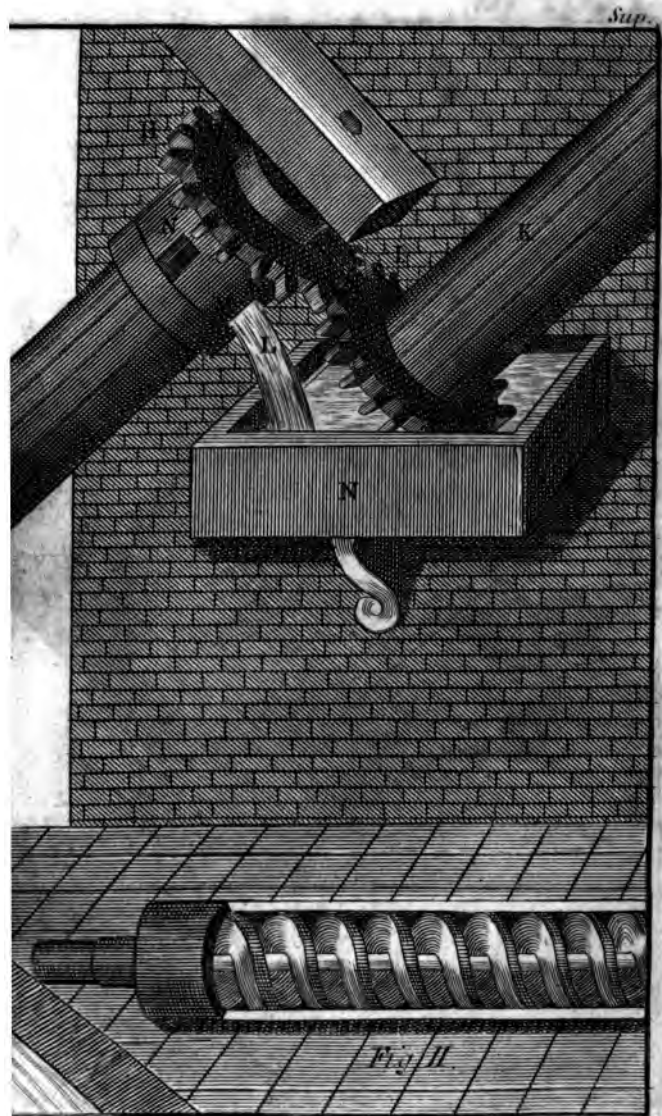
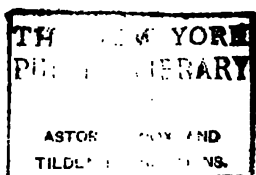


PLATE. XXX.

Fig. III.

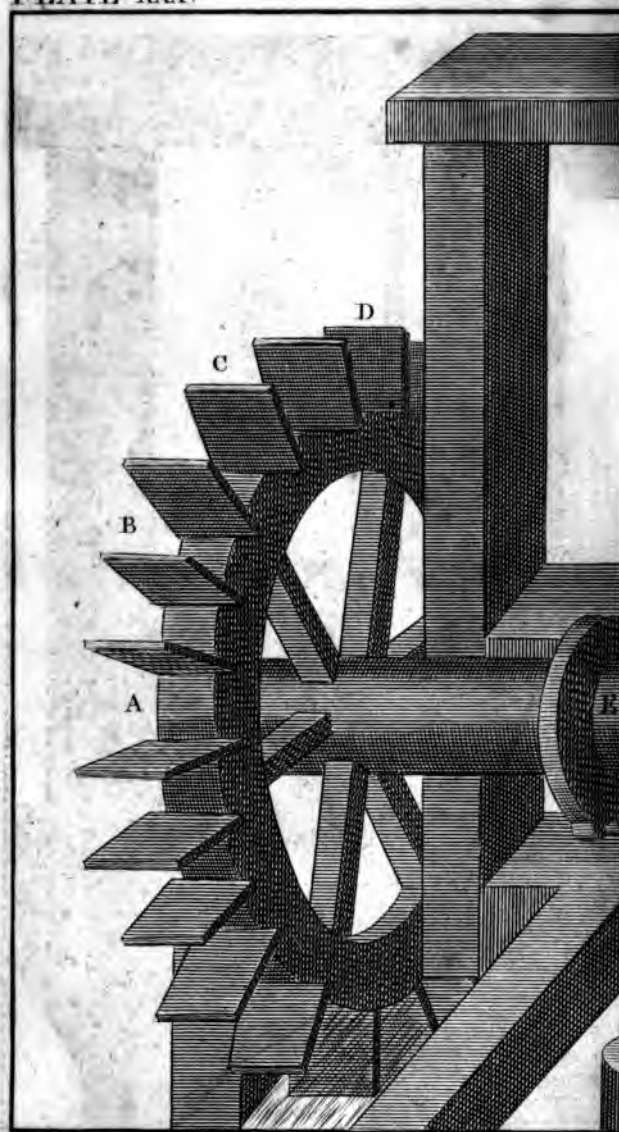


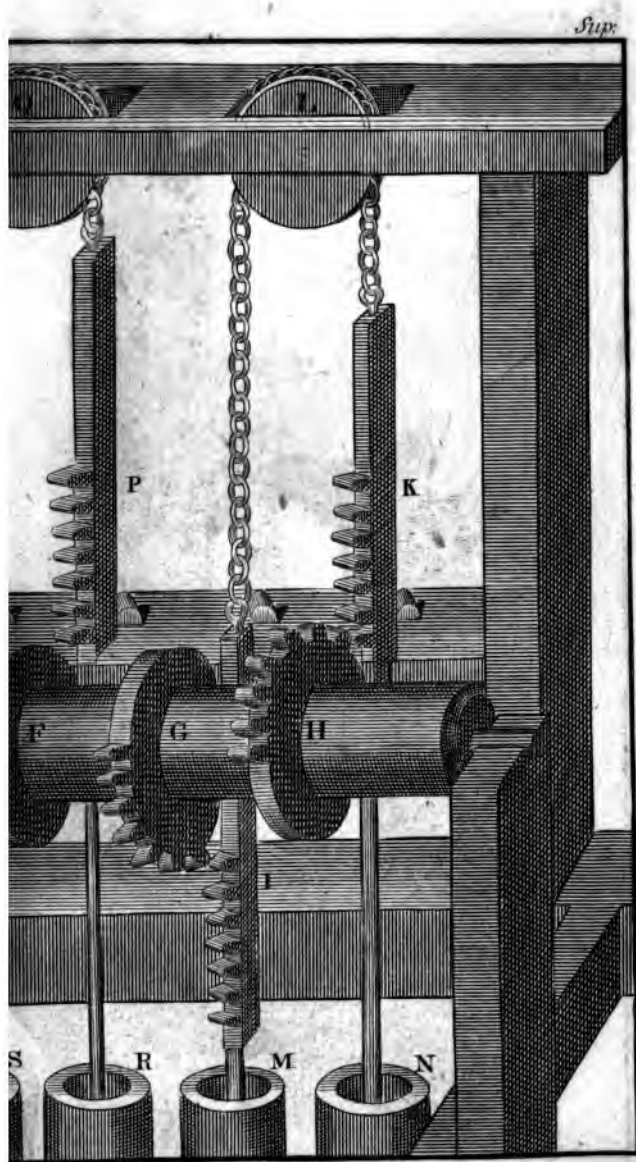


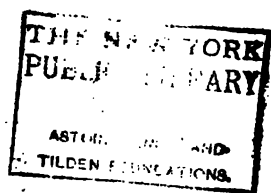


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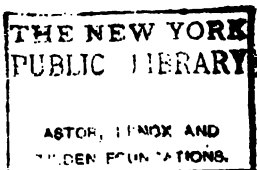
PLATE XXX.







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TILDEN FOUNDATIONS



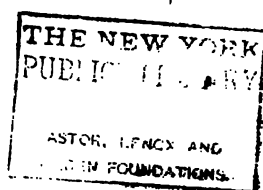
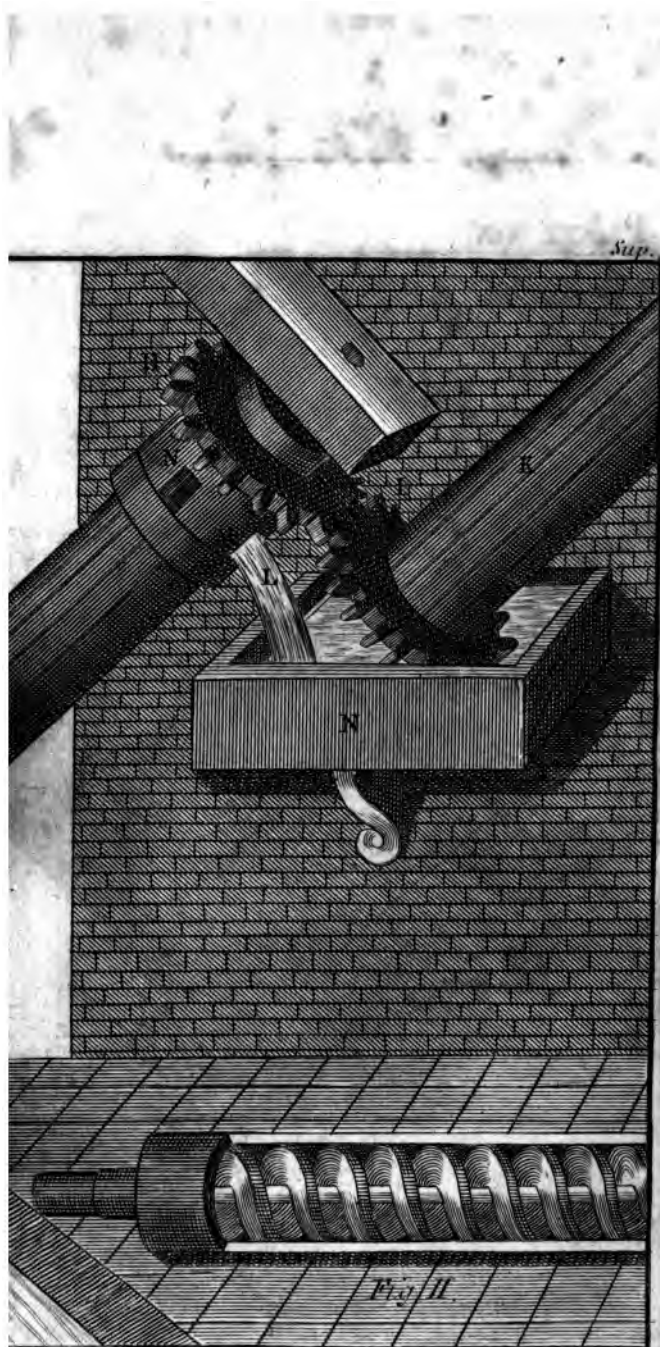
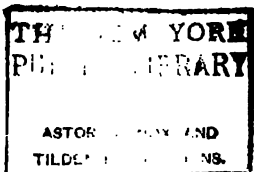


PLATE. XXIX.

Fig. III.

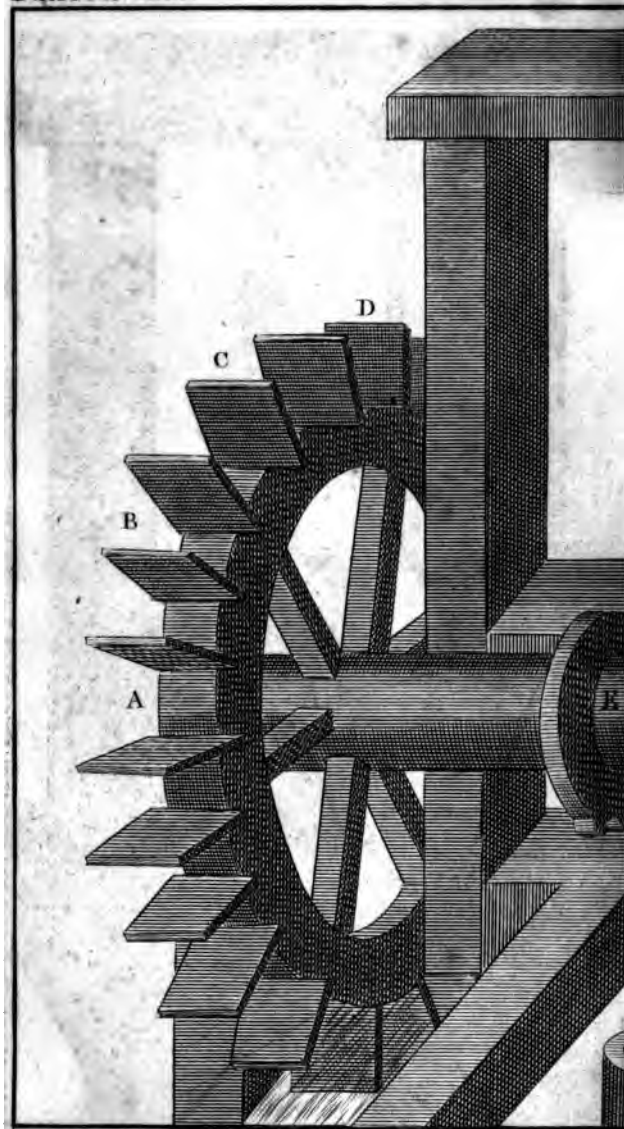


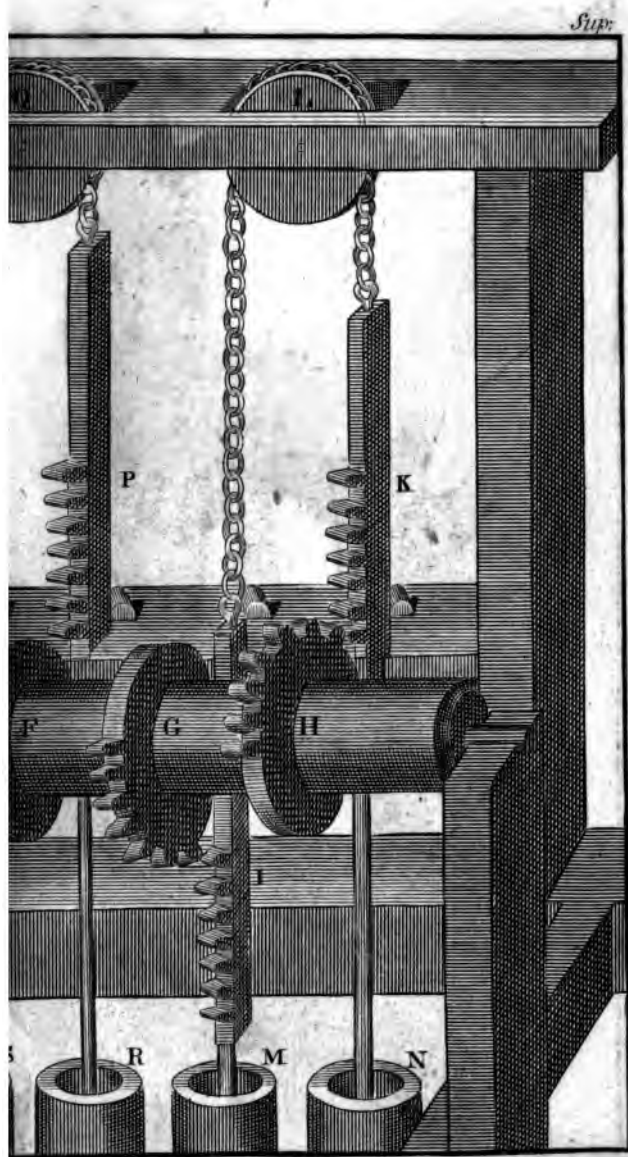




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PLATE XXX.





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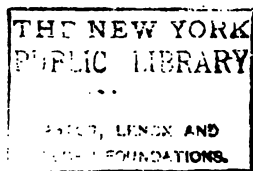
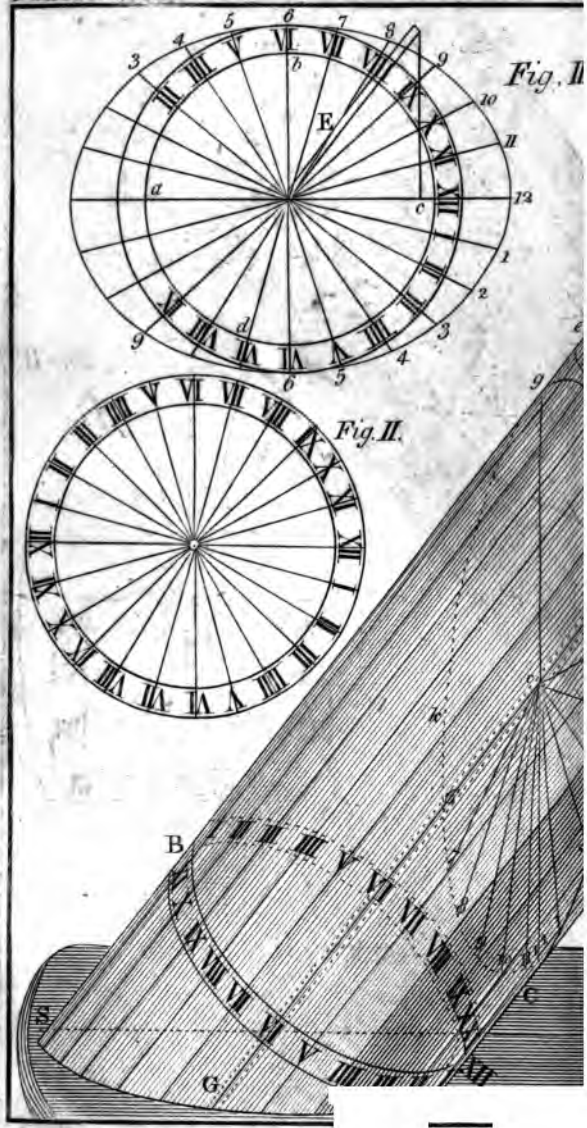
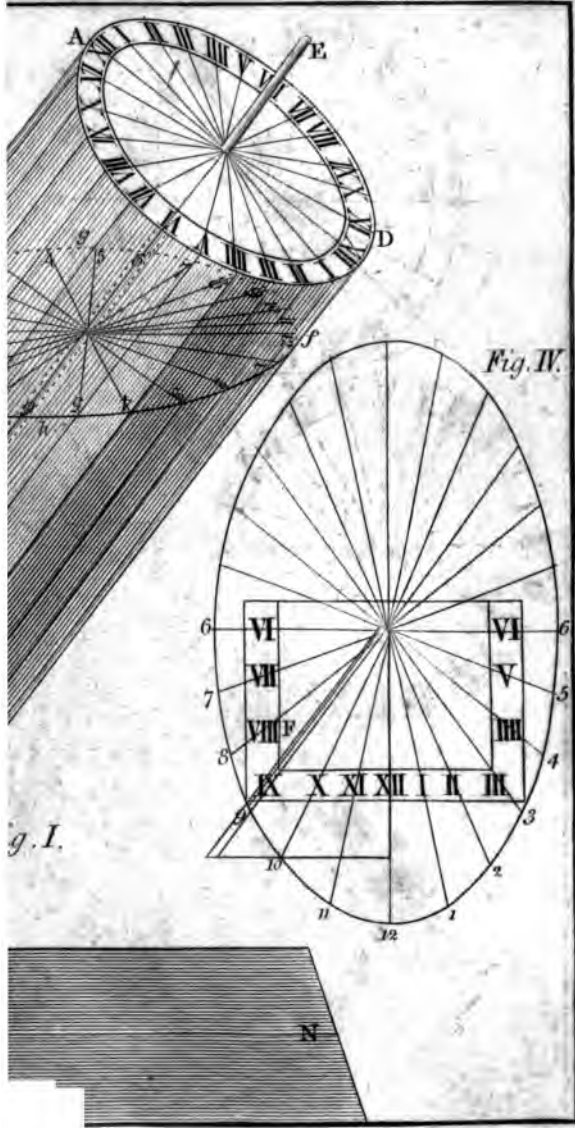


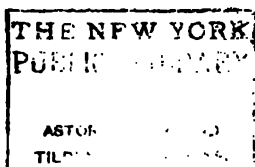
PLATE XXXI

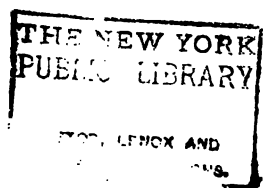


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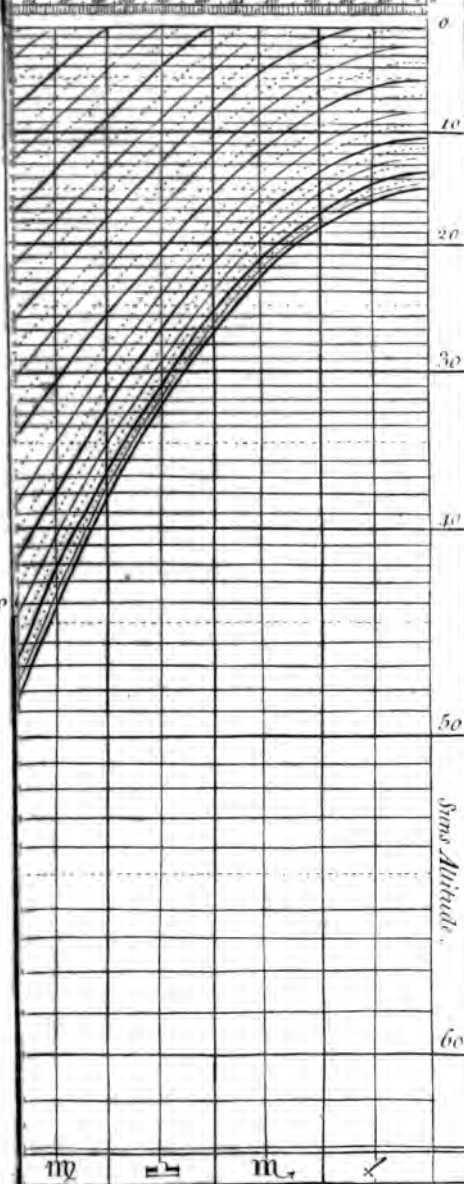
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TILDEN FOUNDATIONS

PLATE XXXIII

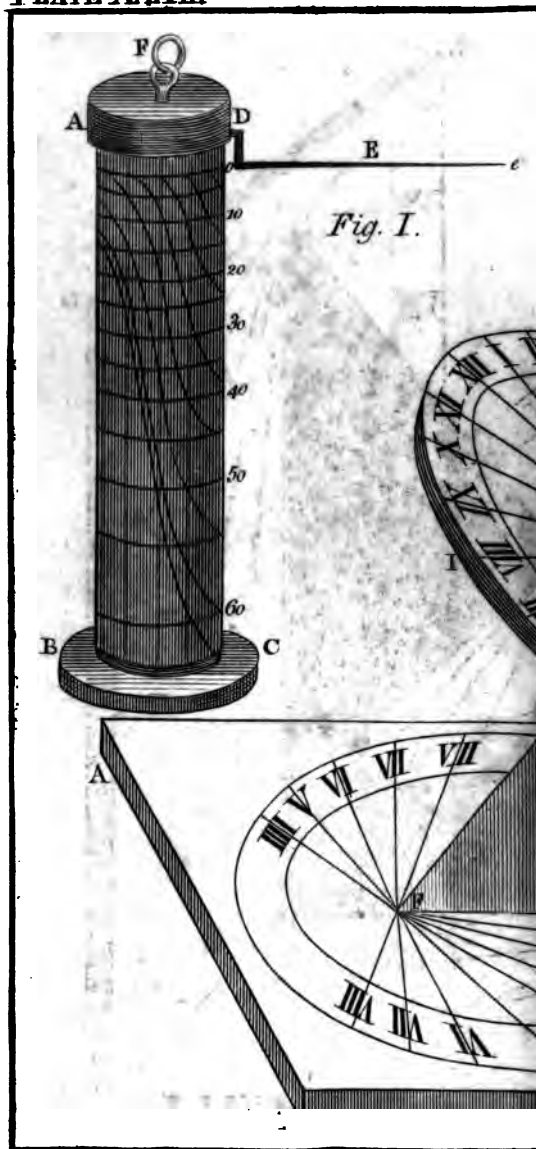
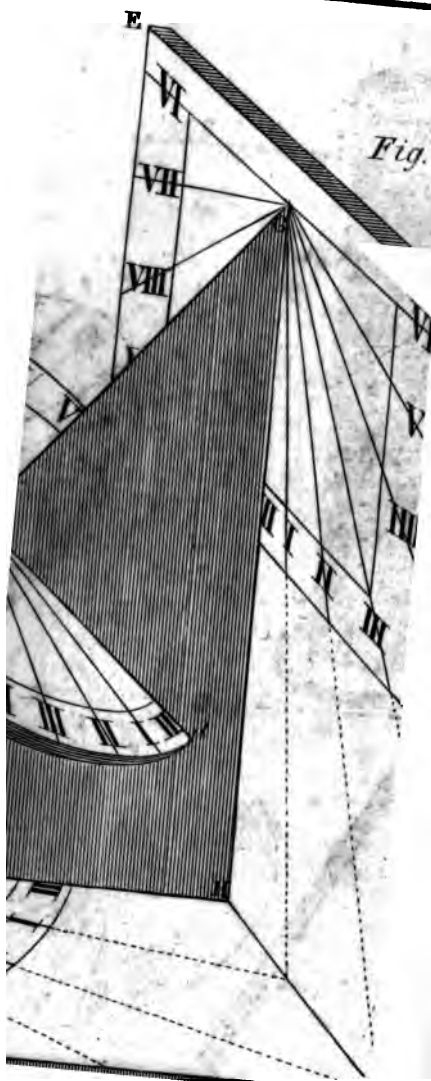
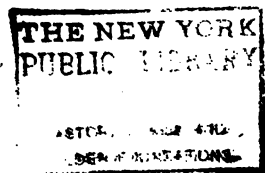


Fig. II.



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ASTOR LENOX TILDEN FOUNDATION
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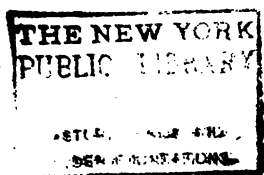


PLATE XXXIV.

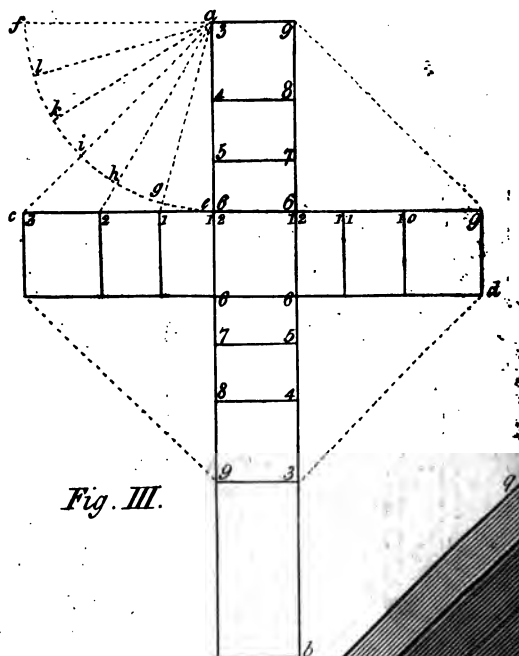
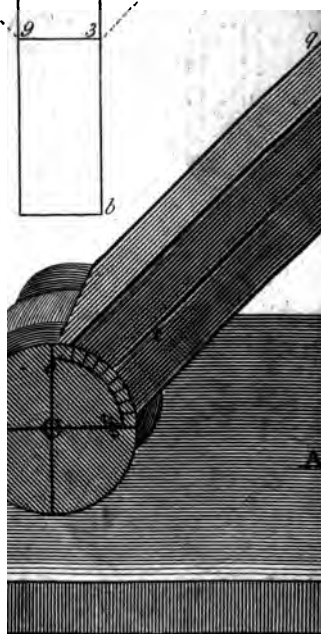
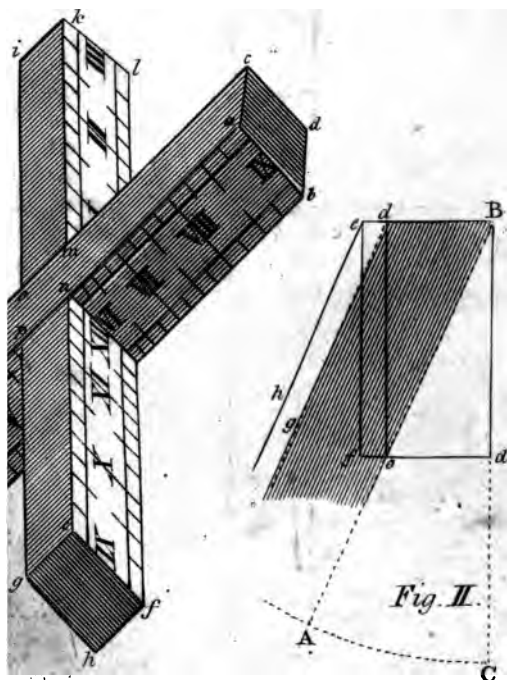
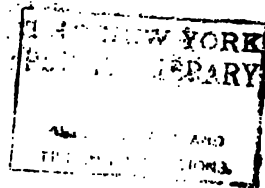


Fig. III.





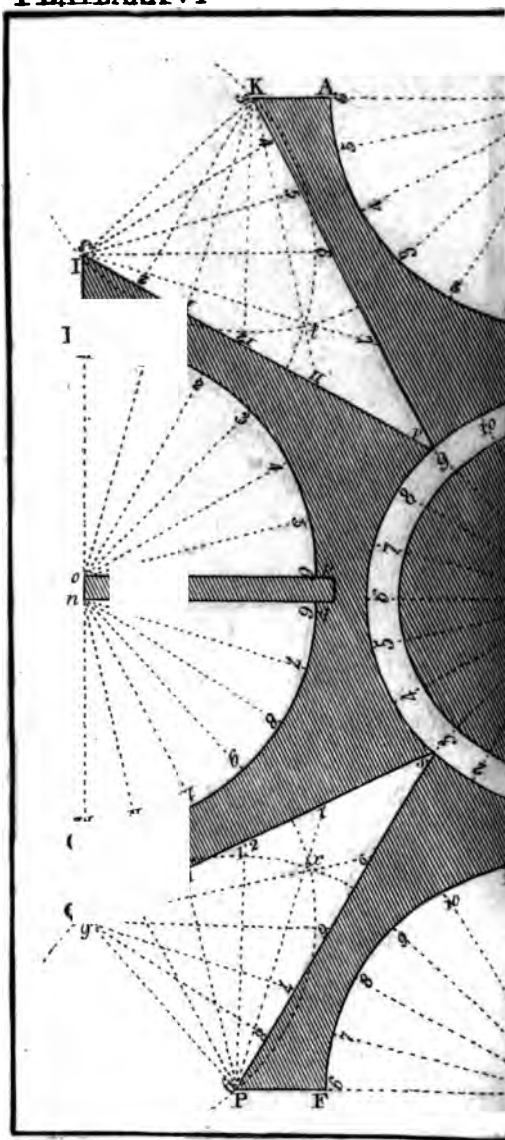


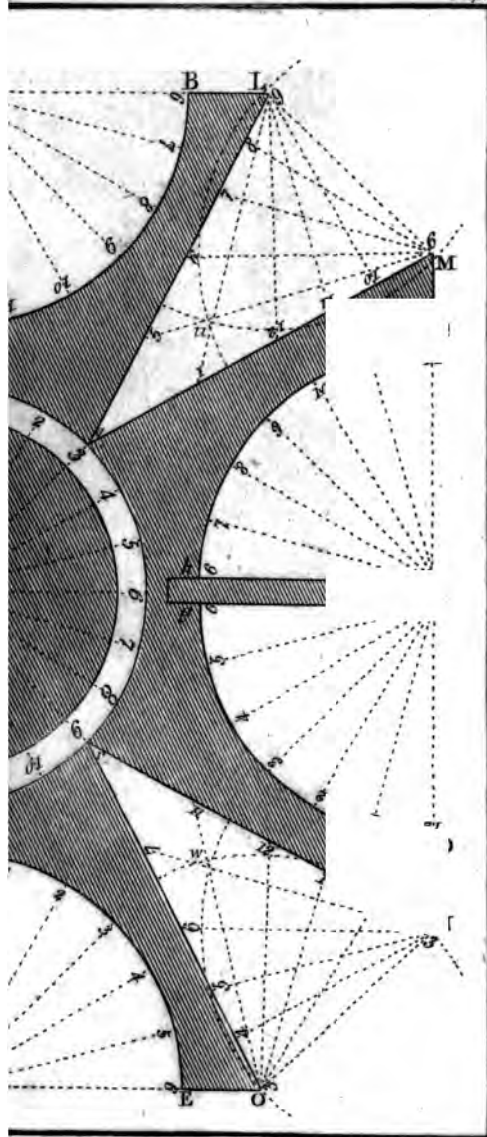


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PLATEXXXVI





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Fig. 2.

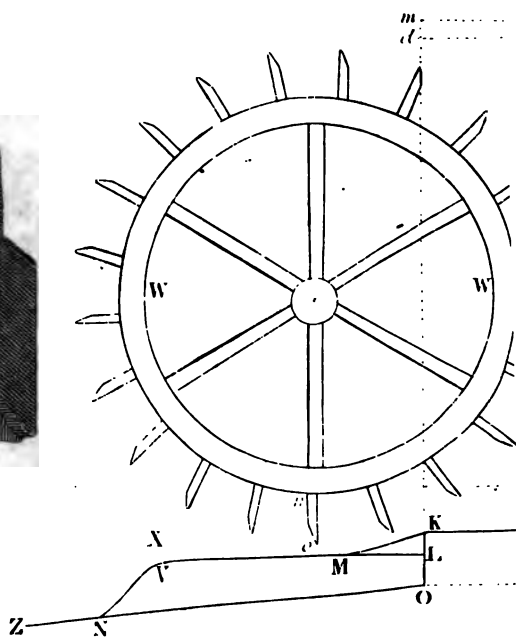
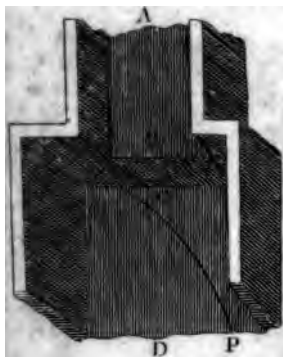
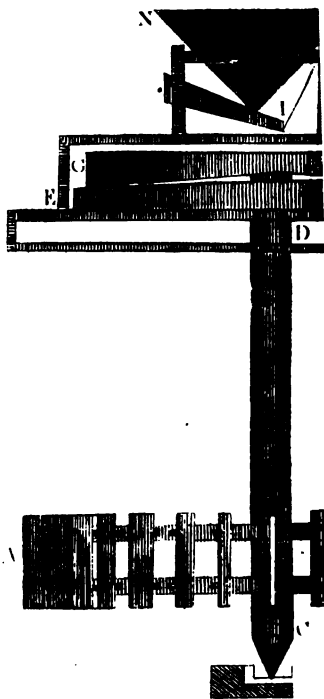
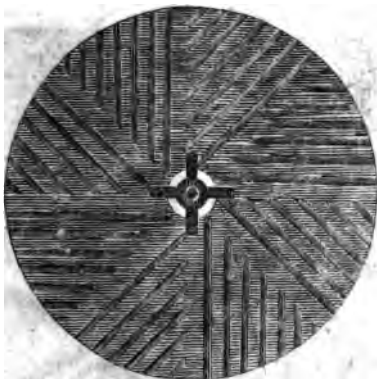
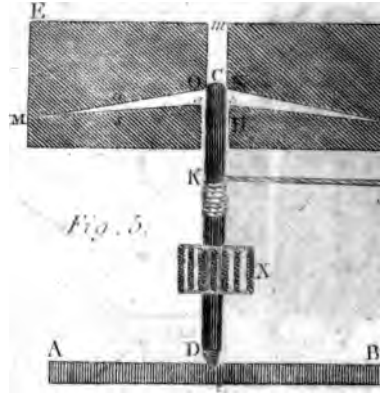
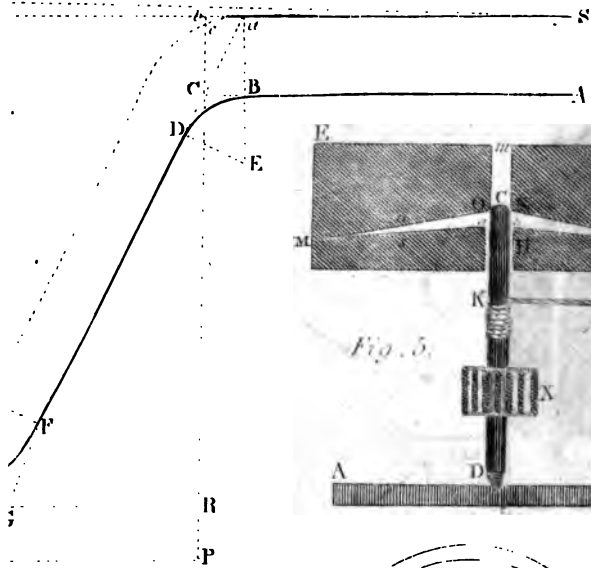


Fig. 1.





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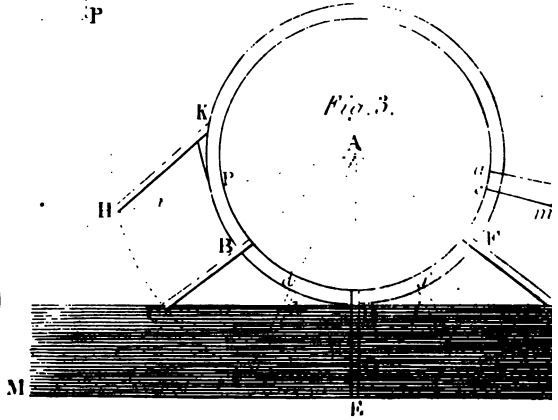
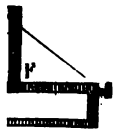
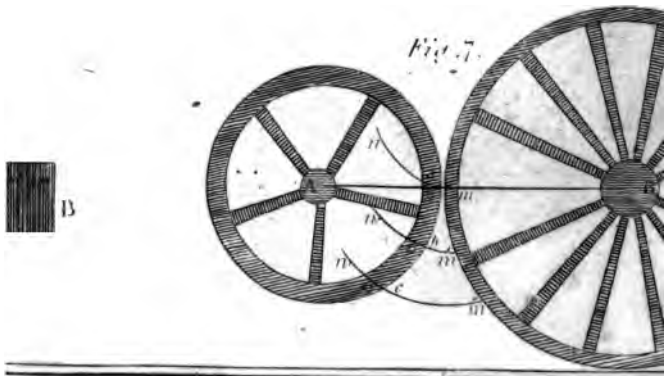


Fig. 7.



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TILDEN FOUNDATIONS

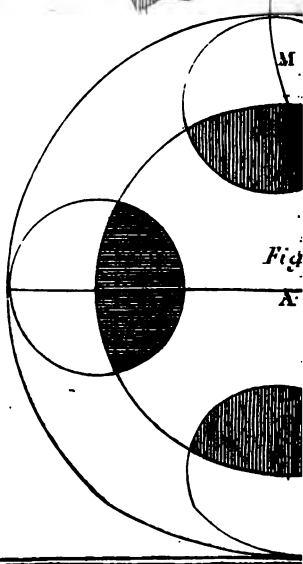
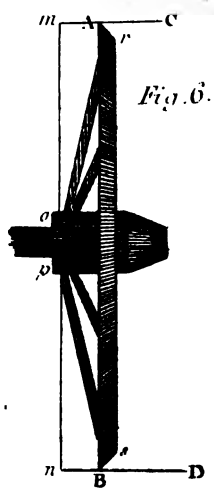
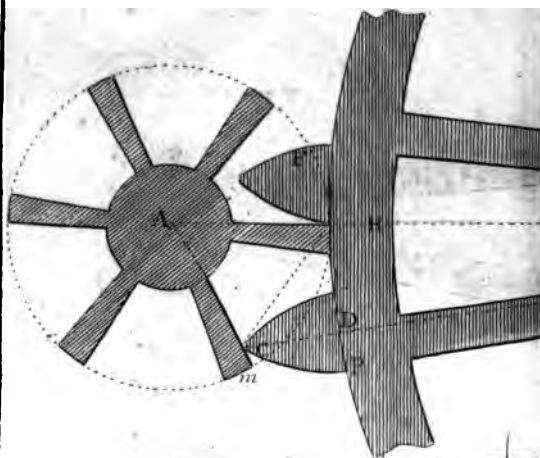
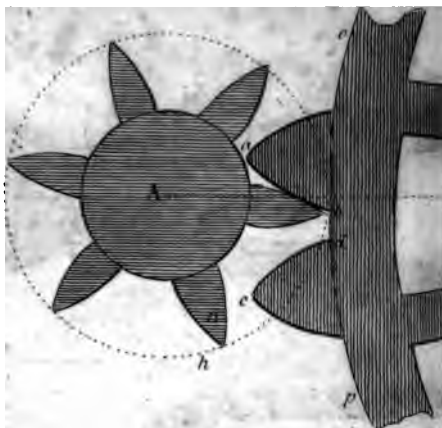


Fig. 2.

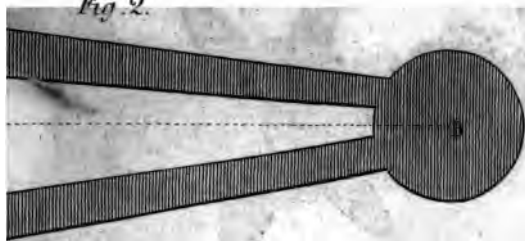


Fig. A.

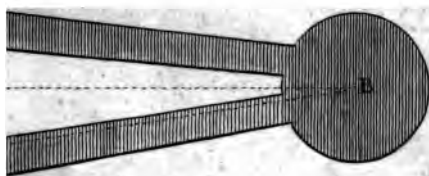
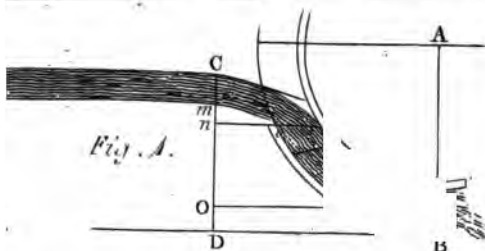


Fig. 5.

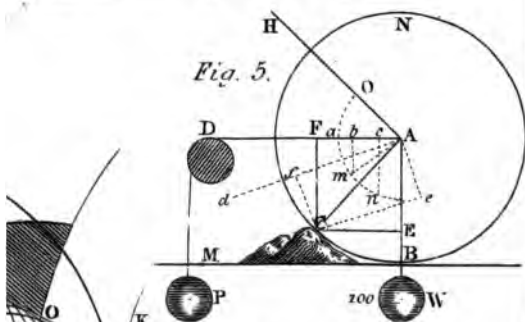
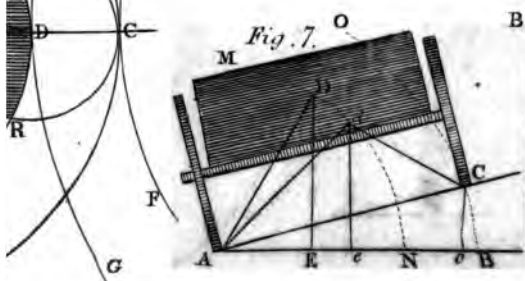


Fig. 7.



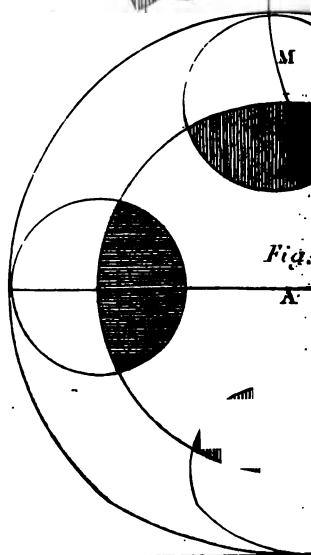
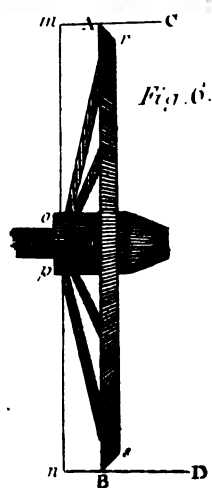
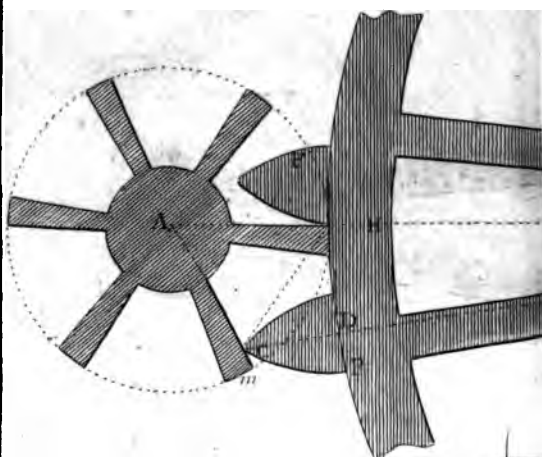
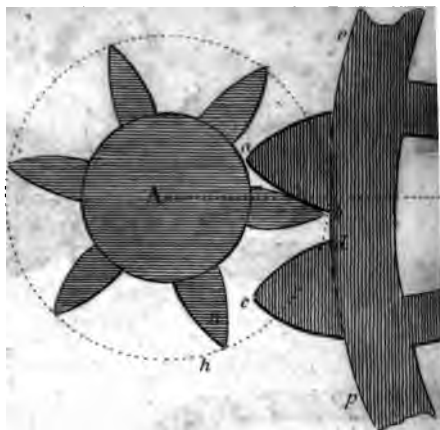


Fig. 2.

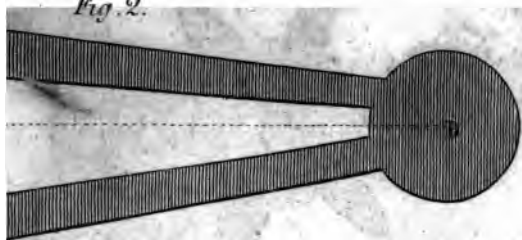


Fig. A.

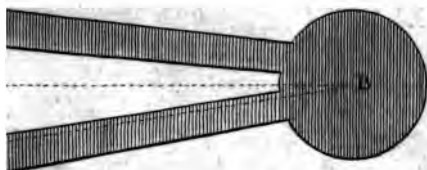
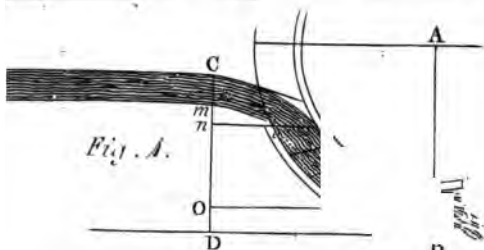


Fig. 5.

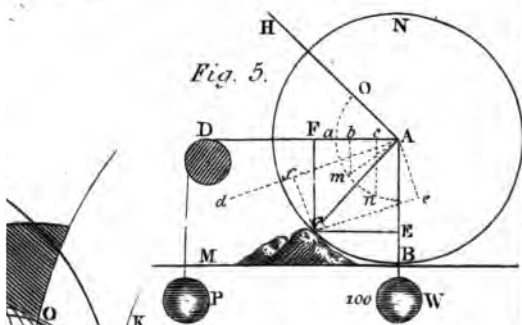
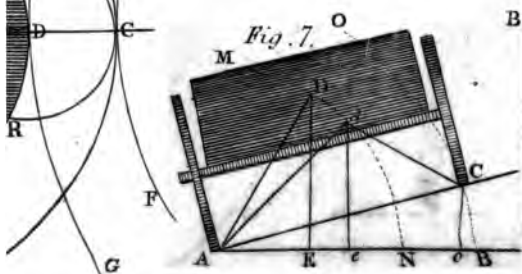
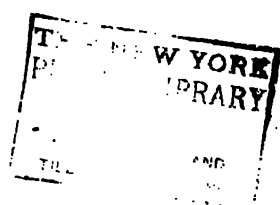
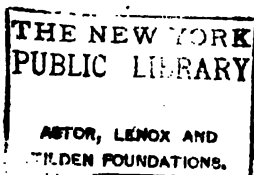


Fig. 7.







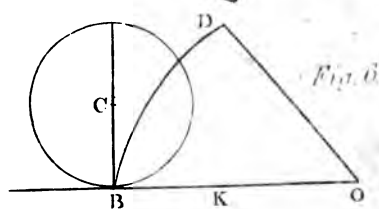
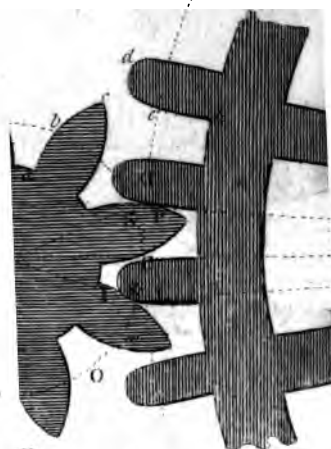
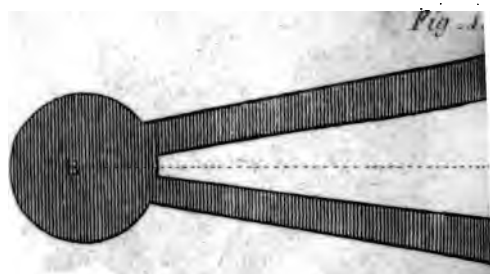
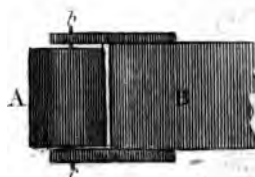


Fig. 3.



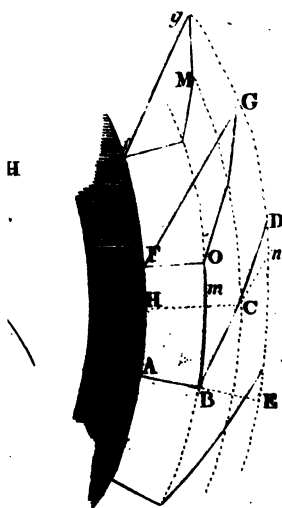
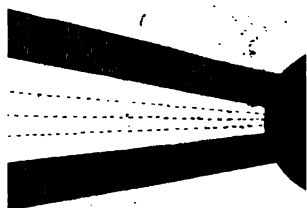
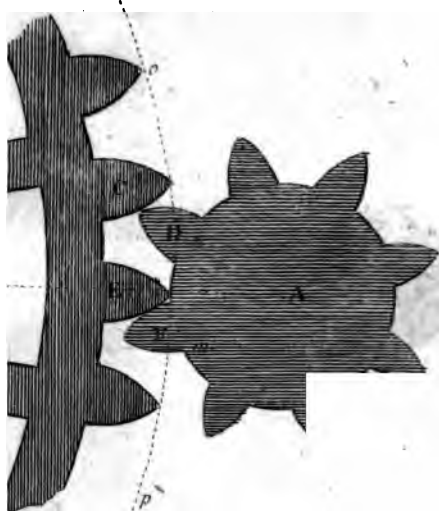


Fig. 4.

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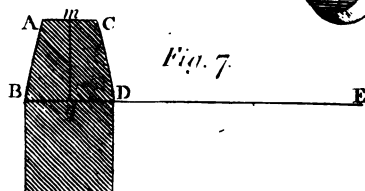
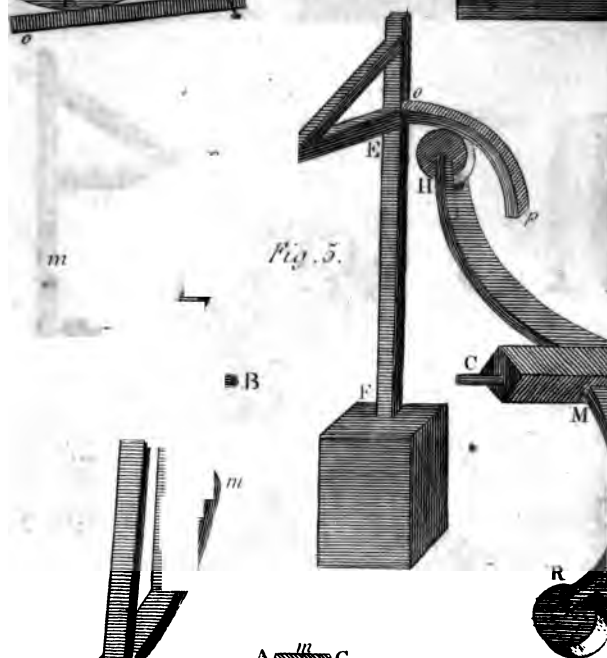
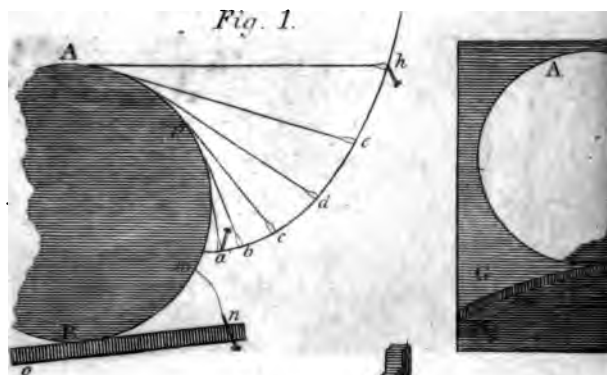


Fig. 3.

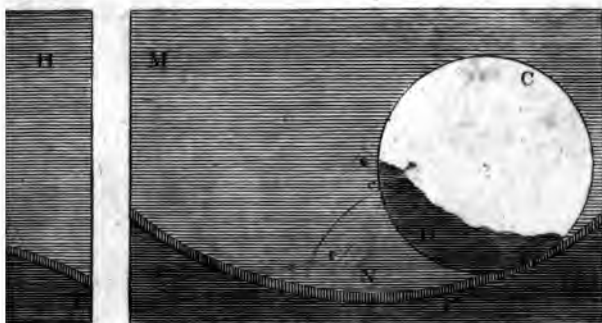


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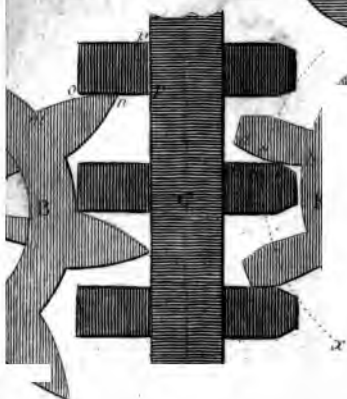


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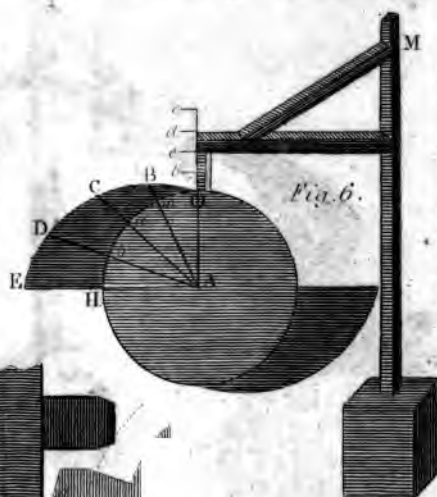
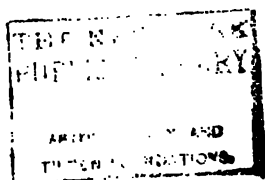
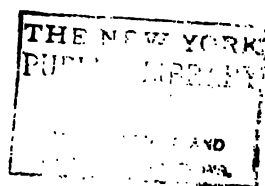


Fig. 4.







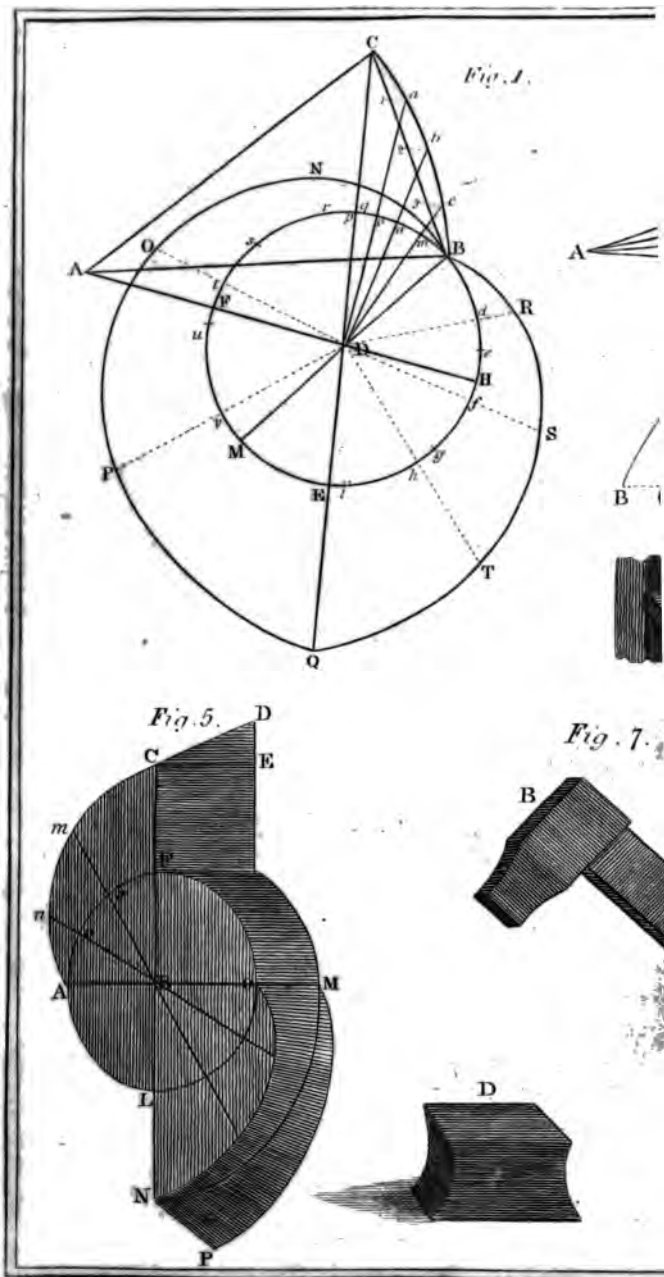


Fig. 2.

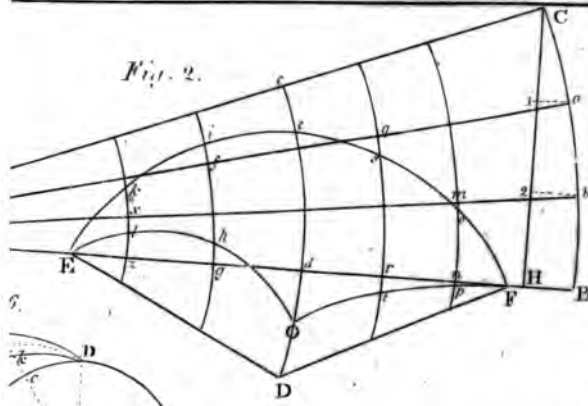


Fig. 4.

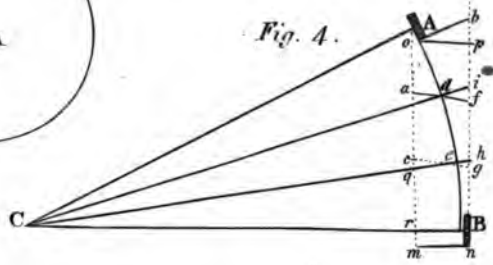
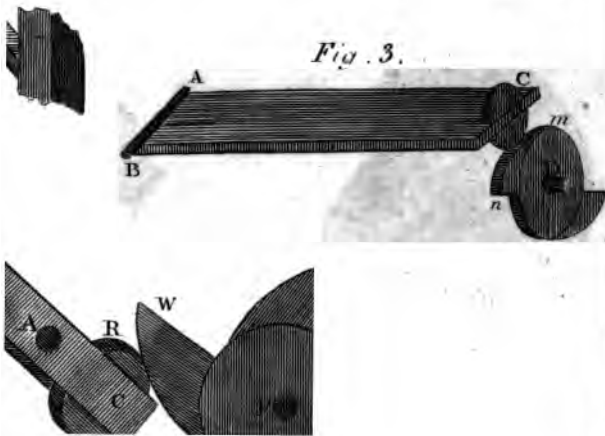


Fig. 3.



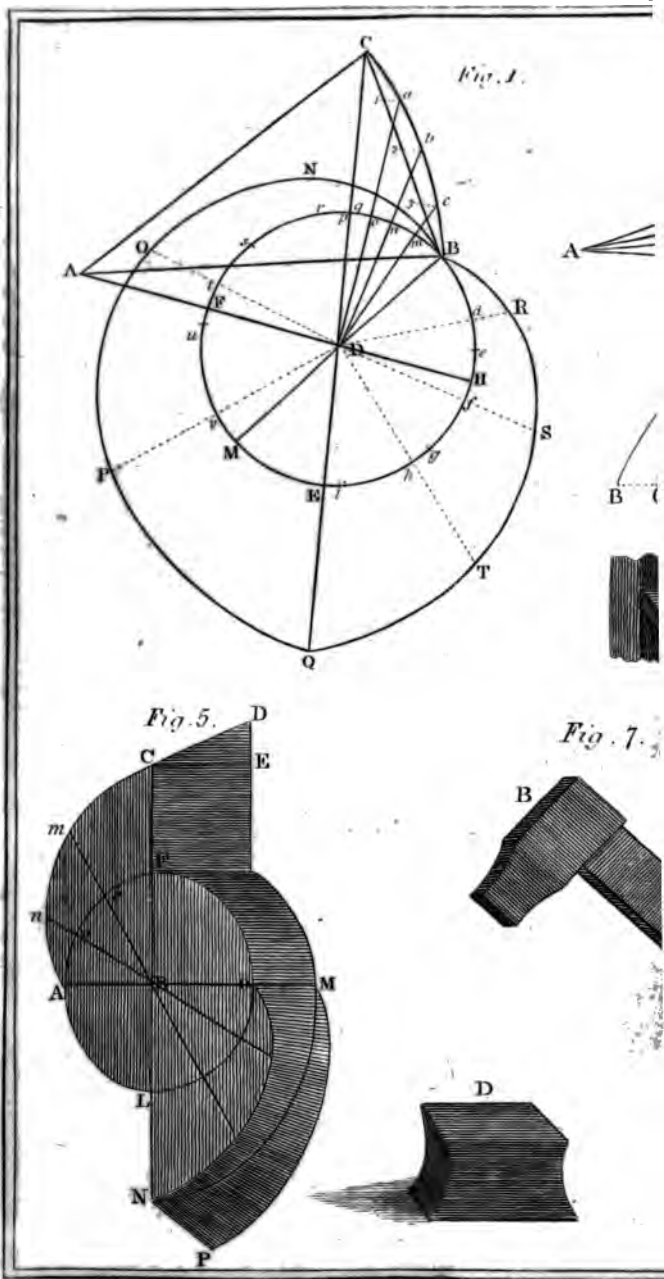


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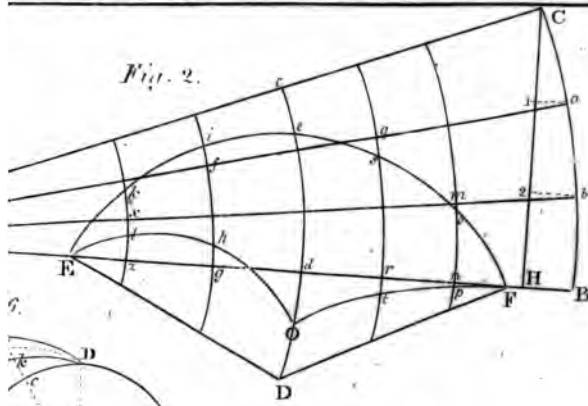


Fig. 4.

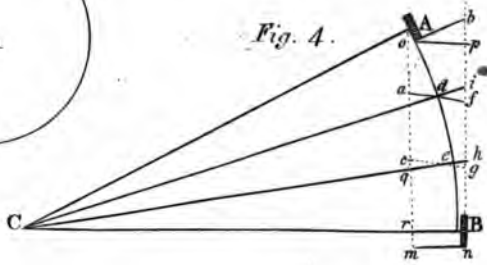
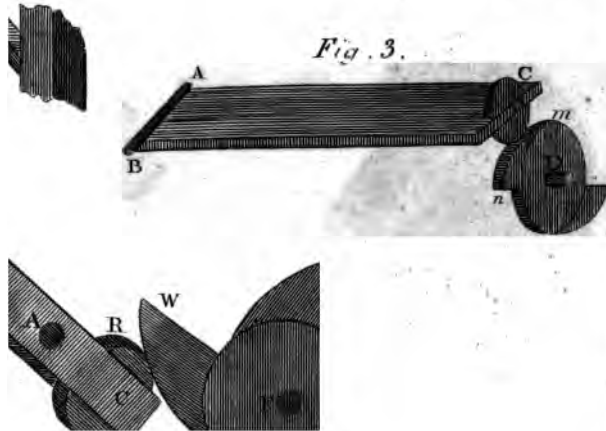
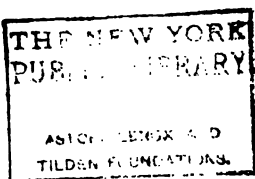


Fig. 3.



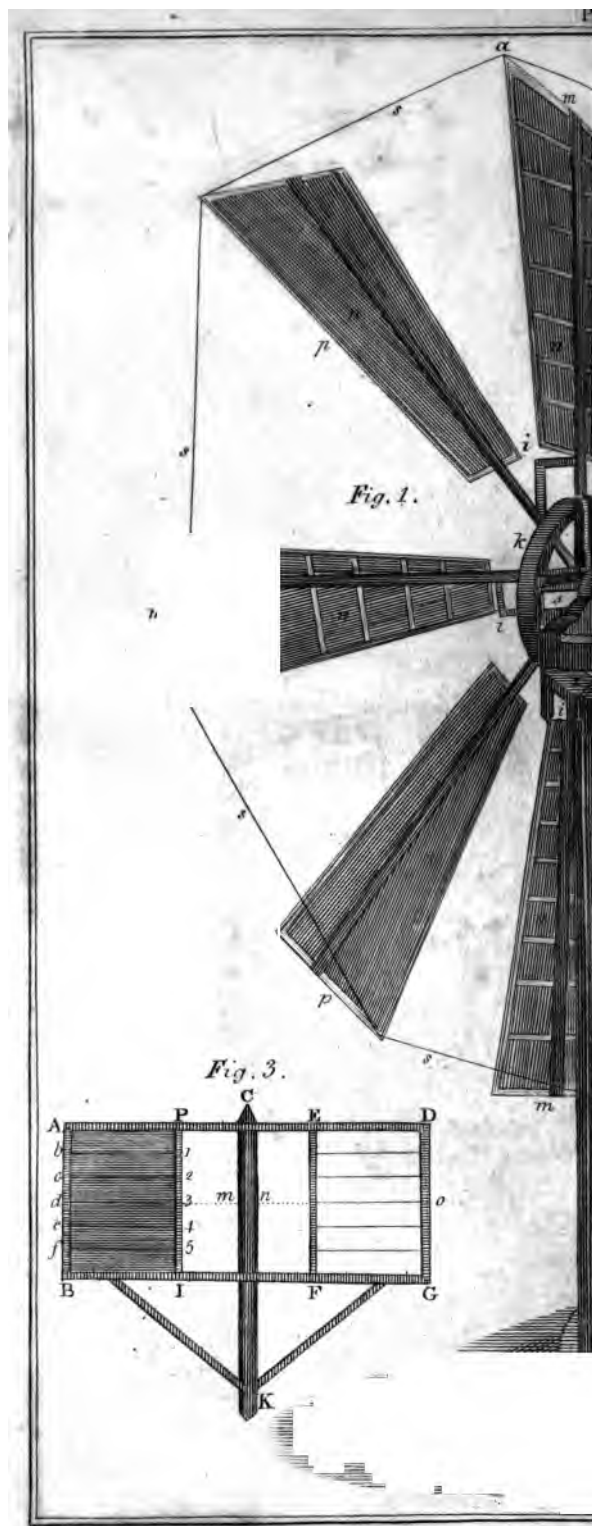


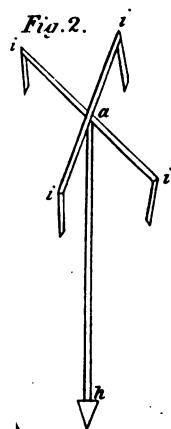
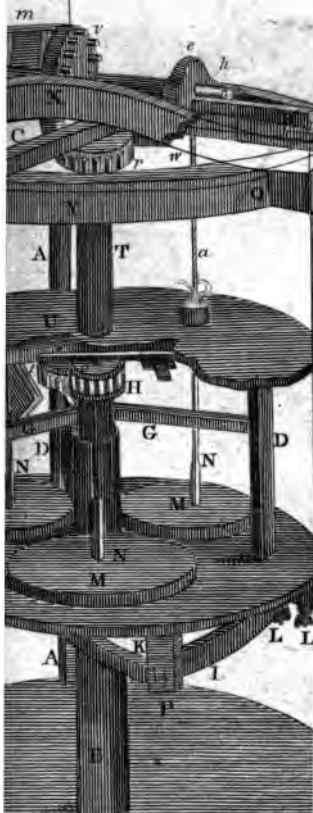
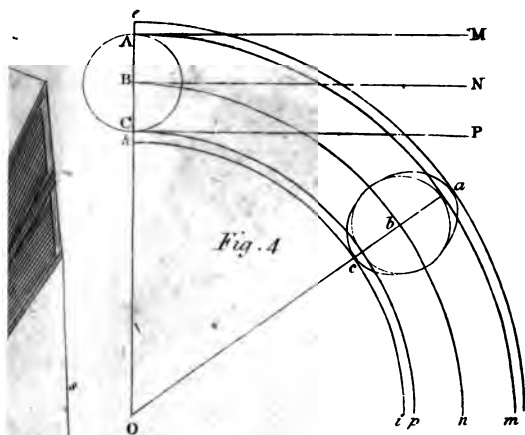
THE NEW YORK
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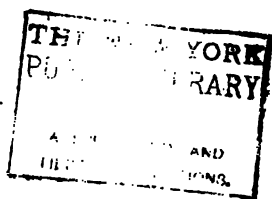
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PUBLIC LIBRARY

ASTOR, LENOX, AND
TILDEN FOUNDATIONS

THE NEW YORK
PUBLIC LIBRARY
ASTOR LENOX TILDEN FOUNDATION
1215 6TH AVENUE
NEW YORK 17, N.Y.

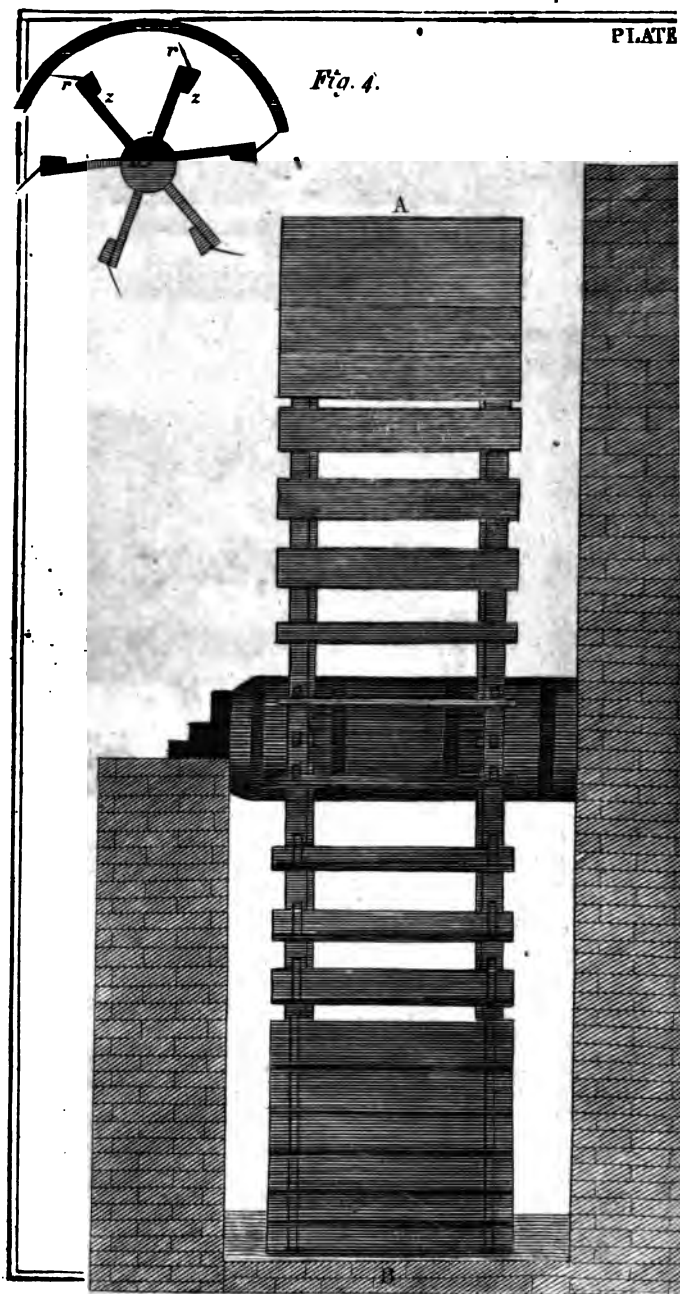


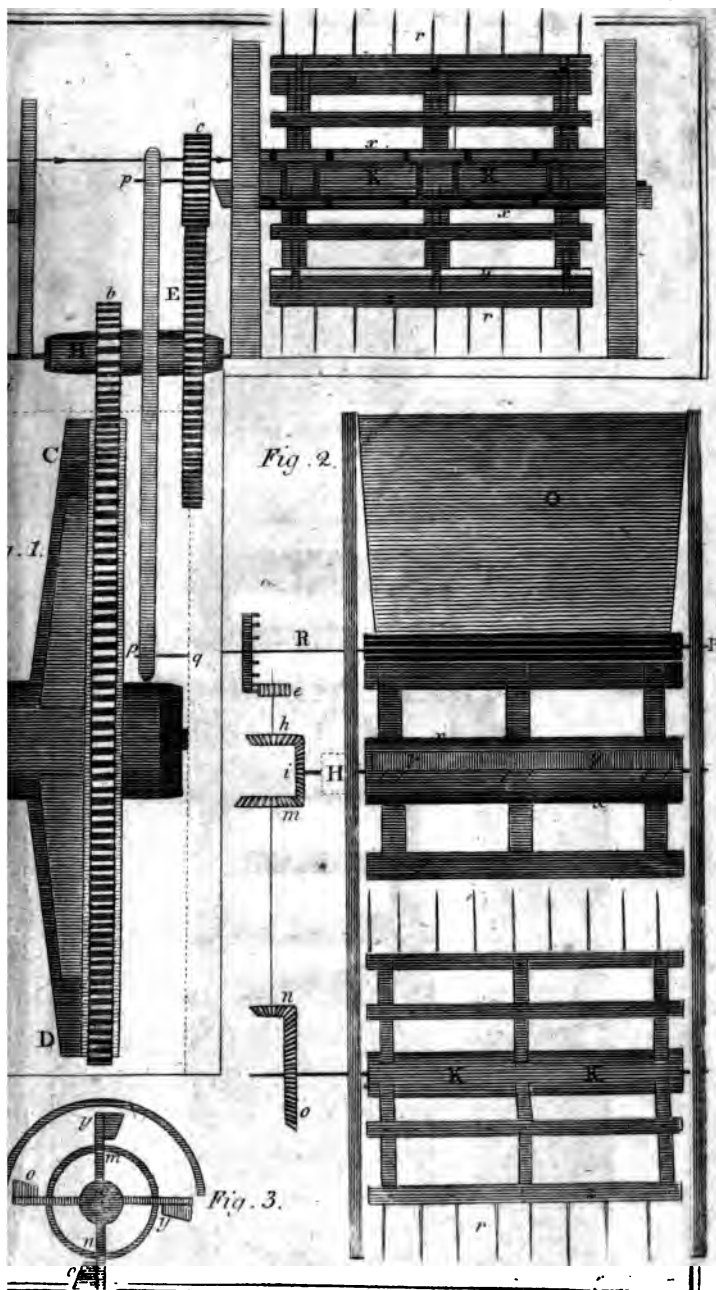




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TILDEN FOUNDATIONS.

Fig. 4.





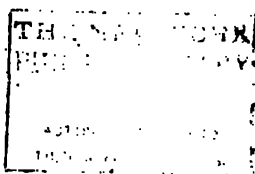
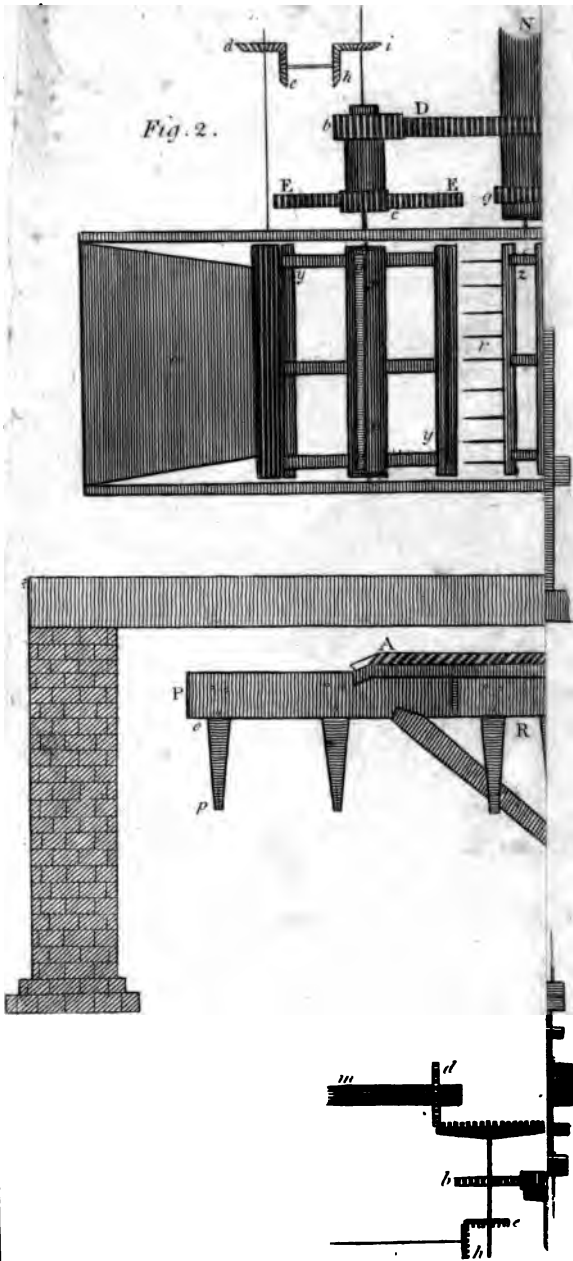
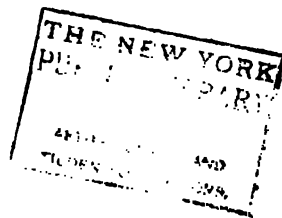


Fig. 2.





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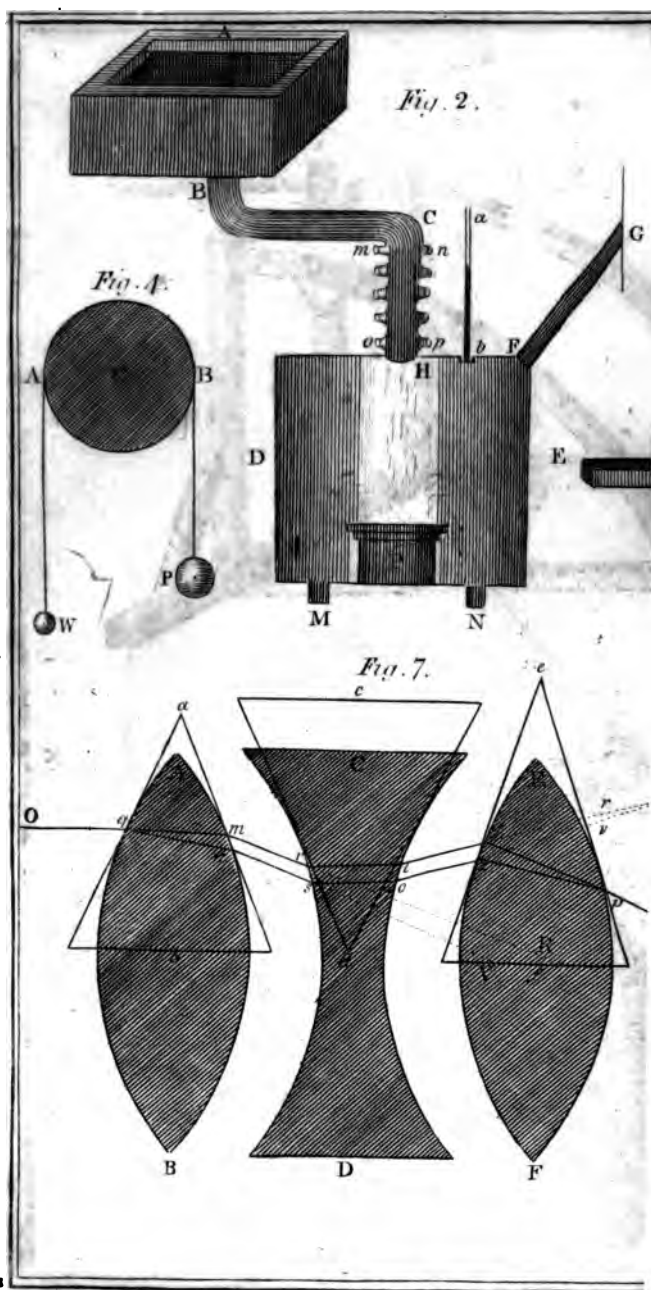


Fig. 1.

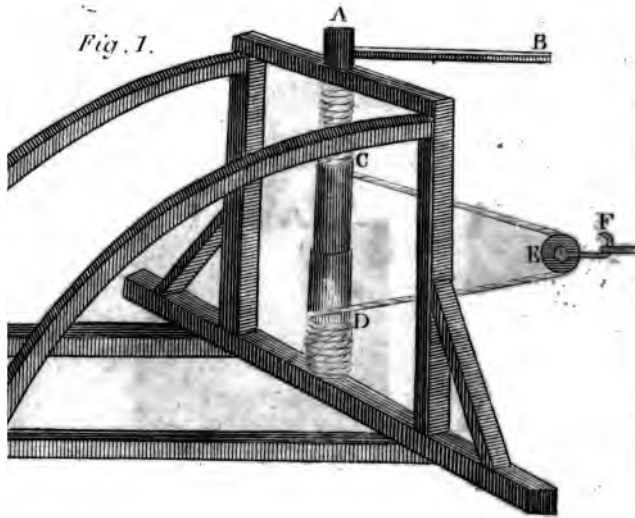


Fig. 5.

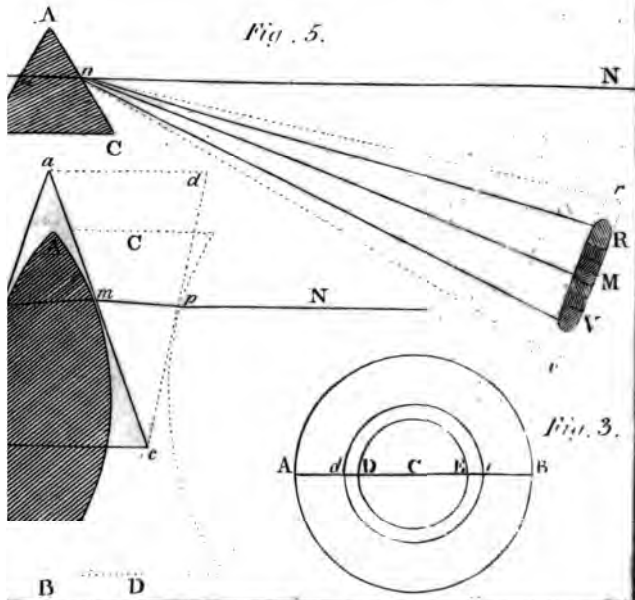
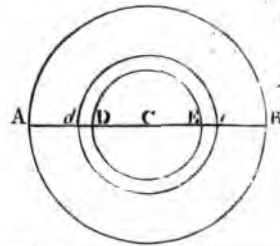
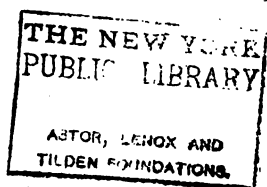


Fig. 3.

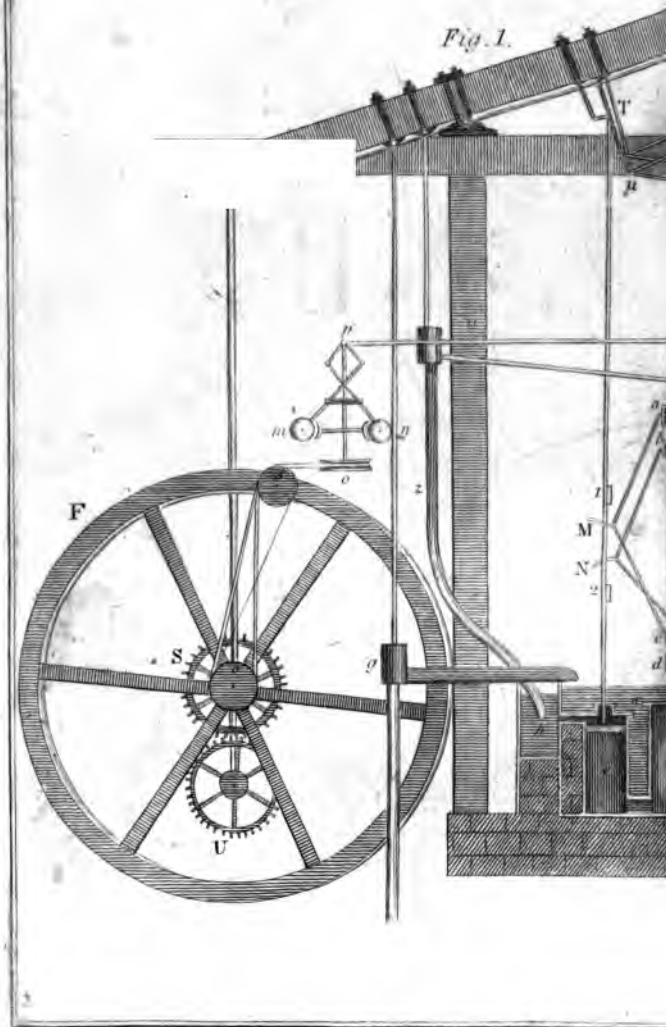


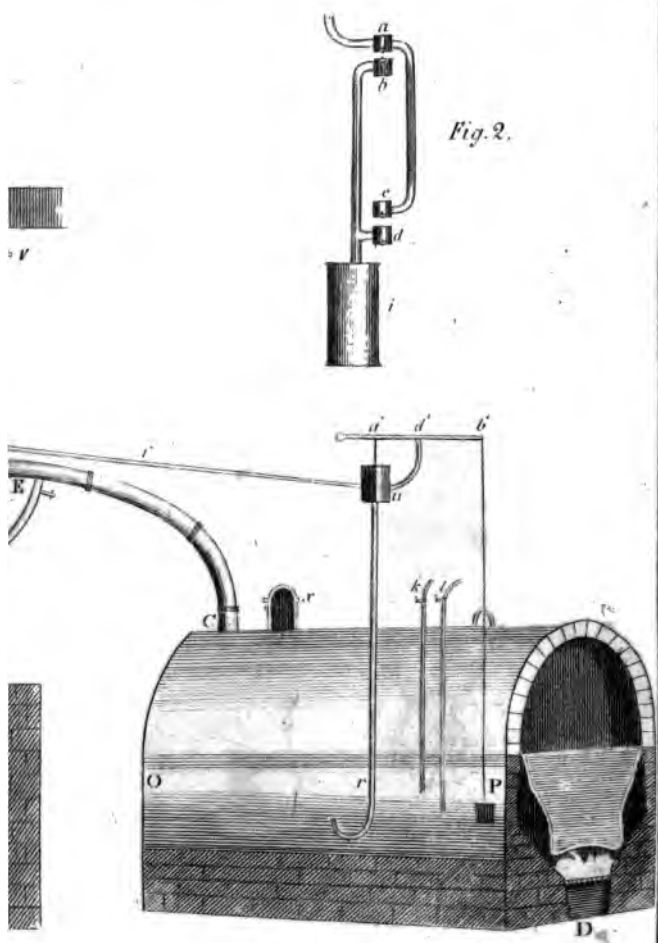
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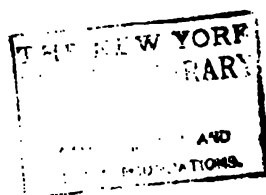


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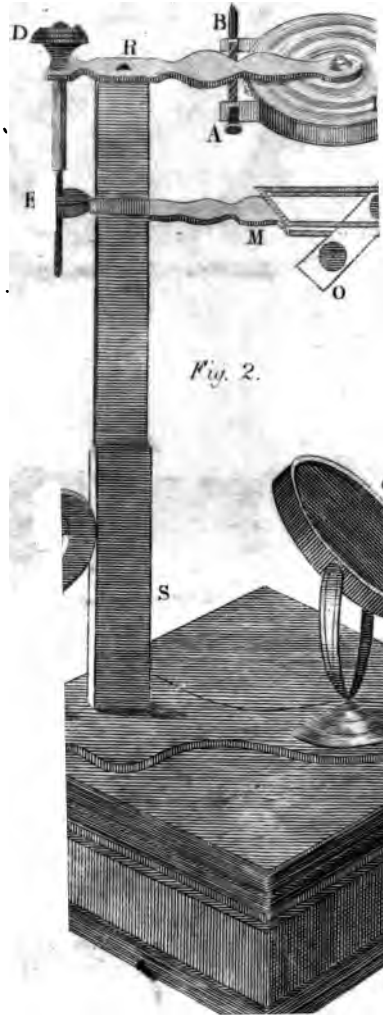






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Fig. 3.

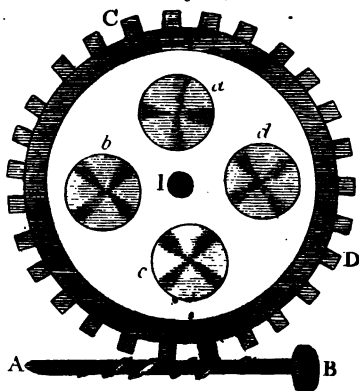


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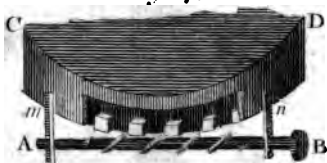
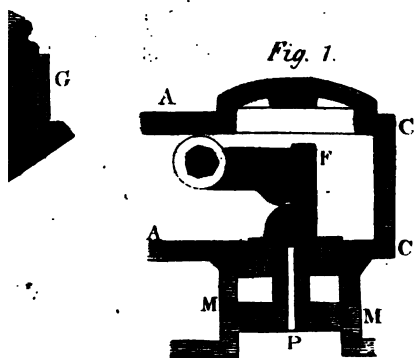
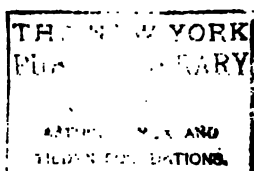


Fig. 1.





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Fig. 5.

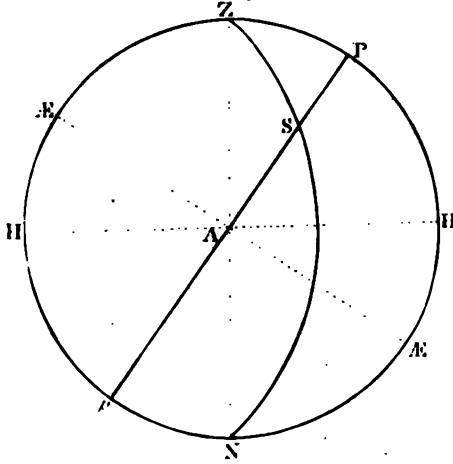


Fig. 1.

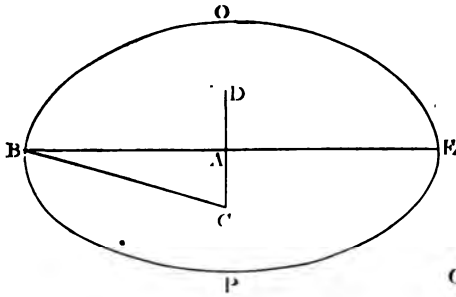


Fig. 8.

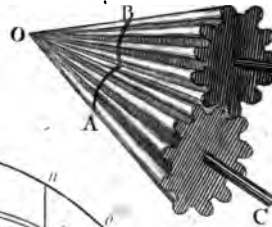
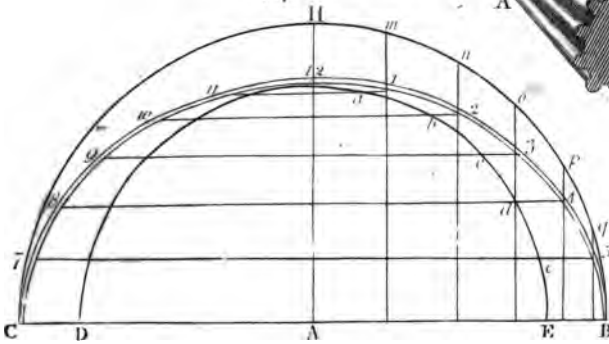
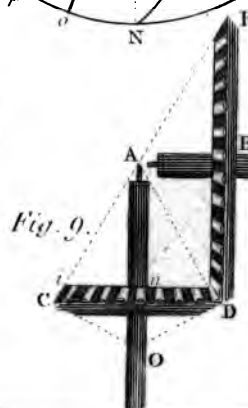
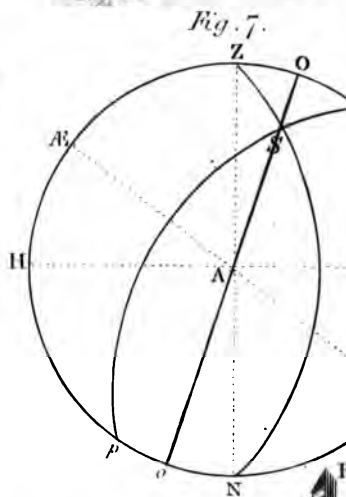
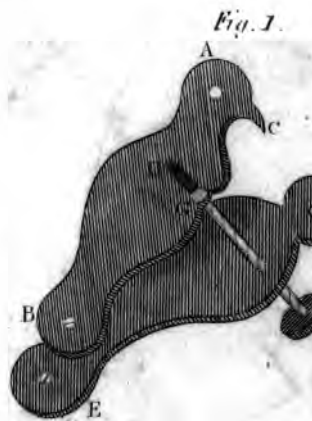
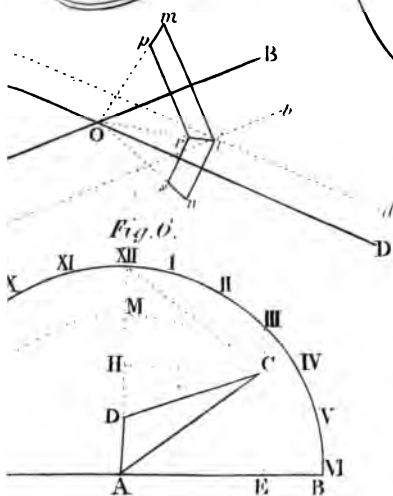
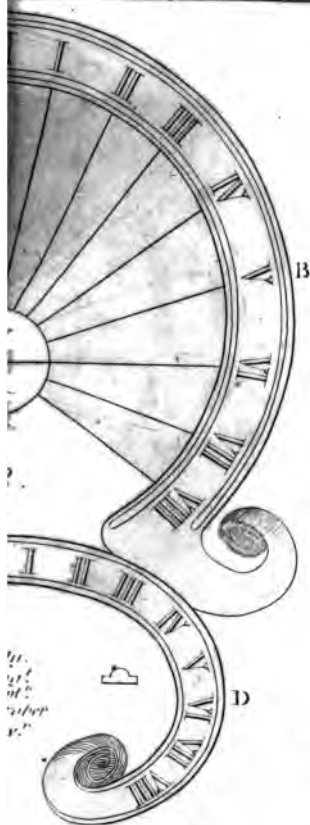
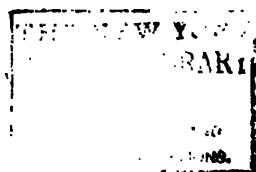


Fig. 3.







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